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EGYPTIAN AGRICULTURAL MECHANIZATION PROJECT

Contract Number 263-0031-HHC-01

ACTIVITY REPORT NUMBER 9

1 April 1983 - 30 June 1983

Submitted by
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TABLE OF CONTENTS

1.0	Summary	1
2.0	Project Accomplishments	4
3.0	Financial and Technical Level of Effort	12
4.0	Implementation	12
5.0	Next Quarter's Objectives	15

LISTS OF FIGURES

Figure 1.1	Comparison of Project Projected and Actual Expenditures	2
Figure 1.2	Credit Funds	2

LISTS OF TABLES

Table 2.1	Service Center/Village Workshop	9
Table 3.1	Financial Level of Effort	13
Table 3.2	Level of Effort: Technical Staff	14

ANNEXES

Annex A	Monthly Reports	17
Annex B	Evaluation of the Water-Lift Loan Fund	136
Annex C	Machinery Demonstration Evaluation Series No. 1 - Silage Mowers	176
Annex D	Opportunity Cost of Animal Labor In Egyptian Irrigation Agriculture	208
Annex E	Research and Development: Primary and Secondary Tillage Test Procedures	227

1.0 SUMMARY

Figure 1.1 reviews the Project's budgeted expenditures and actual expenditures for the calendar year 1983: As of June 30, 19 percent of the Grant has been physically expended as compared to a projected 20 percent, an additional 27 percent is in the pipeline as compared to a projected 20 percent, and 46 percent is in the pipeline/expended category as compared to a projected 39 percent. Thus, the Project is on its expenditure schedule.

The status of the three credit funds are summarized in Figure 1.2:

1. Service Center Fund (Value--\$ 5 million)
 - a. Sixty-eight percent of the fund is at the banks: 14 percent expended and committed, 54 percent under bank review.
 - b. Overall fund activity represents 13 area service centers and 36 village workshops.

2. Waterlifting Fund (Value--\$ 2 million)

Sixty-eight percent of the fund has been expended and the final quarter tranche ordered.

3. Machine Introduction (Value--\$ 2 million)

This fund has just been organized and is now in operation: three percent has been expended and 14 percent is under Project review; this represents 360 equipment units (see section 2.4.2 for details).

Briefly, activity highlights (section 2.0) are as follows:

1. Extension -- received 11 combines and demonstrated these on 350 feddans of wheat; demonstrated mower-binders in wheat on 595 feddans; and developed a television program on mechanical rice transplanting.
2. Training -- 2,021 trainees participated in 191 courses; of 15 proposed observational tours, 11 are in process at USAID/Washington.
3. Research/Development -- tillage experiments have been installed for maize in Gianacelis and for cotton at Sakha; in addition, row spacing and seed placement experiments with maize have been installed at Gianacelis.
4. Land Improvement -- completed demonstration land levelling program with EWUP and started Project village basin demonstration program.

Figure 1:1

Comparison of Project Projected and Actual Expenditures

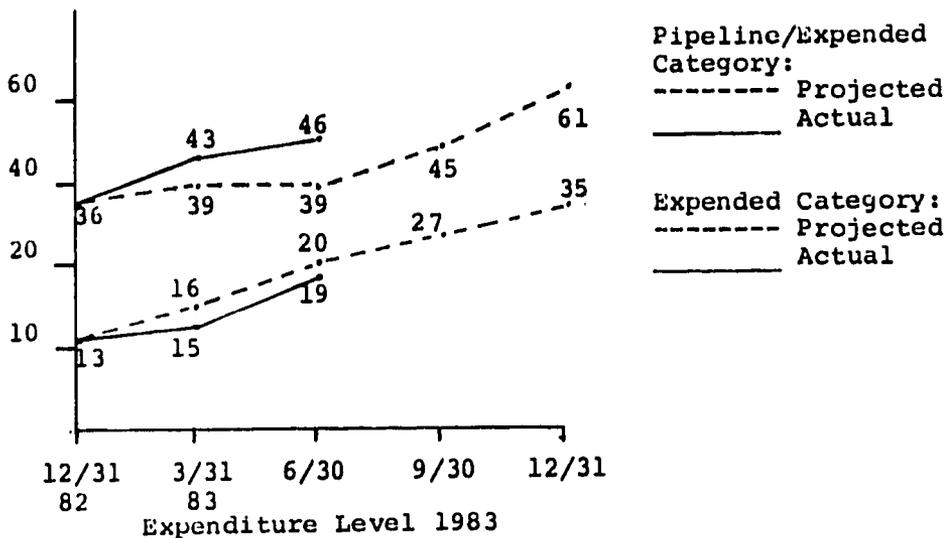
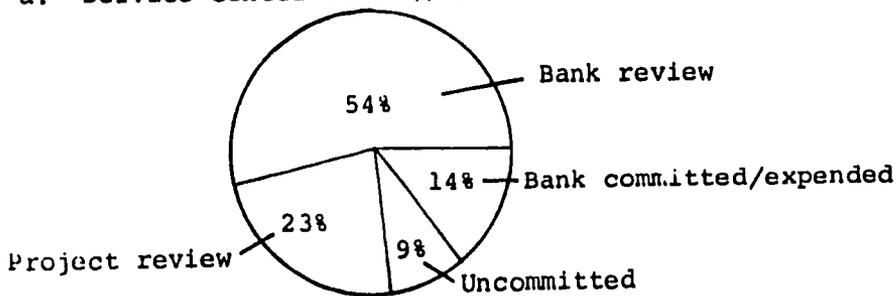


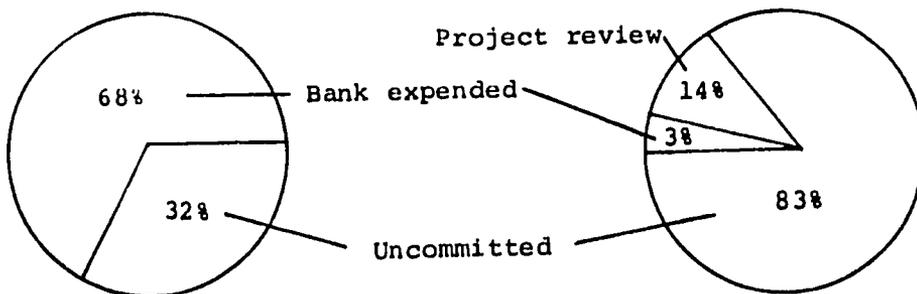
Figure 1.2

Credit Funds

a. Service Center Fund (\$ 5.0 million)



b. Waterlift Fund (\$ 2.0 million) c. Machine Introduction Fund (\$ 2.0 million)



5. Planning/Evaluation-- Prepared a sectoral budget supporting the mechanization plan, completed long-term berseem and wheat data collation from the farm management study, evaluated the Project's cotton-stalk cutting program of this past winter.
6. Local manufacturing-- completed manufacturing of five farm prototype semi-mounted axial flow threshers and successfully tested there in wheat.
7. Service Center/Village Workshop Development-- see the preceding summarization of the Service Center Fund.

Most implementation issues (Section 4.0) have been reasonably resolved. However, Project implementation has been delayed because of ceilings on fuel use and bureaucratic delays in processing the Project's cash needs request: The lack of cash postponed the procurement of demonstration/training equipment and training center activities. Because of the latter problem, equipment demonstrations for the spring rowcrop season were delayed. Inadequate available transportation has limited some project activities.

Major objectives for the next report period include:

1. Approval of Amendment 2 extending the farm management position and extension/training coordinator's position for one year.
2. Reach a 27 percent expended level and 50% pipeline/expended position.
3. Formally submit an extension IFB of \$ 3.5 to \$ 4.0 million for bid tender.
4. Prepare final drawings for the semi-mounted axial flow thresher.
5. Prepare reports on wheat mechanization, long term berseem crop enterprise budget and its impact upon mechanization, and evaluation of the Project's wheat mechanization activities.

2.0 PROJECT ACCOMPLISHMENTS

2.1 Overall Accomplishments

1. Prepared an extension/training equipment IFB for state-side procurement: estimated value is \$ 3.6 million.
2. Grant Agreement Amendment No. 2 approved by MOA and submitted to USAID.
3. Research soil test equipment received.
4. Service Center and Village Workshop Development program expanded to areas contiguous to the Project.
5. Laser equipment, chisel plows, subsoiler, and backhoes for Land Improvement demonstration units shipped from the United States.

2.2 Economic and Financial Subunit

1. Completed processing farm management data for long-term berseem according to four seedbed preparation methods (animal, mechanical, labor intensive, and none) and two land tenure patterns (rented and owned land).
2. Wheat data collation completed and prepared a draft report on the economics of wheat mechanization.
3. Based upon existing experimental data and the farm management study data, prepared Working Paper No. 7: "Reducing Maize Losses Through Optimizing Planting Dates: A simulation and Economic Analysis". This analysis is important in evaluating mechanization impact upon cropping intensities when maize is preceded by berseem.
4. Prepared a technical report identifying opportunity cost of animal labor used for irrigation.
5. Economic evaluation of mechanical and handplanting of wheat: conducted a field survey comparing yield from using a grain drill in Project areas and hand broadcast planting in the same area.
6. Prepared a sectoral budget to support MOA's Mechanization Plan.
7. With the Evaluation subunit, prepared a sociological assessment of machinery extension programs for USAID.

2.2.2 Evaluation Subunit

1. Prepared Working Paper No. 9: "Agricultural Mechanization and Labor: the Demand and Supply Sides". On the supply side, emigrants from rural areas, internally to urban areas and internationally, exhibited the following characteristics:

- a. The vast majority interviewed were landless, or near landless, working in agriculture prior to emigration.
- b. None of the emigrants (internal or international) upgraded their skill-level so when they returned it was without new skills.
- c. Remittances from emigrants were used mostly for house building and purchases of consumer goods.

On the demand side, the current level of mechanization has not detracted from the demand for hired labor.

2. Evaluation of silage mowers for cotton stalk cutting showed the following preferences:
 - a. Farmers want the entire stalk; therefore pulling is preferred to cutting.
 - b. Cotton stalk cutting is usually acceptable if labor for pulling is not available.
 - c. Silage mower therefore considered as a stop-gap measure rather than a solution since stalks are not cut low enough.
3. Started mechanized wheat evaluation: this study will evaluate the impact of the extension program with regards to grain drills, mower-binders, and combines that have been introduced.
4. Waterlift fund evaluation (Annex C) completed at the start of this period; it was reviewed in Activity Report No. 8 for the last quarter.
5. Prepared the social analysis component for an agricultural sector paper on mechanization for USAID.
6. Continuing the review of literature on agricultural mechanization that incorporates new reports.
7. Working Paper No. 6: "Agricultural Mechanization Project Village Profiles" completed.

2.3 Research and Development Subproject

1. Gianaclis maize research experiments established:
 - a. Primary tillage: moldboard plow, disk plow, Justis sweeps, and CP 24 chisel plow at three depths: 15, 22, and 30 cm.
 - b. Row spacing: 60, 70, 80, and 90 cm.
 - c. Seed placement and bed configuration: level, ridge, and furrow placement.
2. Sakha cotton tillage experiments installed in March (Activity Report No. 8) planted in April. Initial conditions identified, e.g., soil moisture, bulk density, and penetration resistance.
3. West Nubaria peanut tillage experiment monitored and tests made: soil moisture, penetration resistance, plant count, plant height, and root growth.
4. Draft reports in preparation:
 - a. Tillage tests
 - b. Potato digging tests
5. Trowse TDY completed the draft report under review: "A Survey of the Suitability of Egyptian Soils for Mechanized Agriculture".
6. Machinery Development TDY
 - a. Italian Gaspardo FB 928-808 mower with windrowing attachments in wheat:
 - (1) wad board with rod extensions: in 90 cm., bearded wheat plugged mower.
 - (2) large rake wheel moved material and made neat windrows with heads top side but this low slung mower dragged windrow.
 - (3) conclusion: mower unsuccessful without major design changes.
 - b. Camon F-10 mower-binder:
 - (1) operated well in bearded wheat making neat bundles without twine.
 - c. Camon F-10 with sickle bar unit and finger reel:
 - (1) would not function in bearded wheat: machine plugged at the throat; reel did not function in standing or down crop because of inadequate adjustments.

- (2) conclusions: unit needs active converging elements, e.g., rake wheels, or augers, to move bearded wheat into windrow.

d. Belin International 2000 Combine:

- (1) problem: wheat will not move up the inclined rubber-apron feed table.
- (2) solution: two-strand rubber slat upper feeder designed and installed.
- (3) conclusion: none as the unit was not field tested.

2.4 Extension/Training Subproject

2.4.1 Overall

1. During April and May most Project village training and extension activities postponed because of lack of operating expenses, as mentioned in the last Activity Report.
2. Initial fuel limitation also hampered Project field activities but some relaxation of this problem has helped in June.
3. Approvals for purchases of Groups 2 and 3 training equipment, pending since January, have been given.
4. Drafted extension/training equipment IFB for stateside purchase.
5. Project working paper number 8 completed, "Mechanization Extension in Egyptian Agriculture".

2.4.2 Extension Unit

1. Eleven combines received, assembled, serviced, and demonstrated. Except for some large farms, combines were not universally accepted because the straw was not available for sale.
2. Eleven balers ordered so that straw could be collected.
3. Demonstration involved:
 - a. Combine: 350 feddans
 - b. Mower Binder: 595 feddans
4. Machine Introduction Fund:
 - a. Dispersed by the banks -- L.E. 44,560
 - b. Approved by the Project committee -- L.E. 238,528

- c. Number of units involved -- 360
- d. Major interest has been as follows:
 - (1) Silage mowers -- 70
 - (2) Mower-binders -- 56
 - (3) Backhoes -- 55
 - (4) Threshers -- 52
 - (5) Land Scrapers -- 32
 - (6) Disc Harrows -- 30
 - (7) Planters -- 26
 - (8) Total -- 231

2.4.3 Extension Information Unit

- 1. Prepared T.V. program on mechanical rice transplanting.
- 2. Worked with the Extension Department regarding direct rice seeding program.
- 3. Preparing landlevelling extension bulletins.

2.4.4 Training Unit

- 1. In-country training involved 2,021 trainees and 191 continuing and new courses.
- 2. Observational tours: 15 proposed and 11 in-process with USAID Washington.
- 3. Technical study program: eight programs proposed involving 56 participants.
- 4. Academic study: six participants under review with USAID Washington.

.5 Service Center/Village Workshop Subproject

- 1. Expansion of the Service Center Fund to adjacent and contiguous areas to the Project has been approved by USAID; this follows more closely existing tractor populations.
- 2. Land registration is the primary constraint to faster bank approval.
- 3. Table 2.1 summarizes the status of the Service Center Fund:
 - a. Nearly half of the first tranche (L.E. 1,247,520) is in the committed/expended category.

TABLE 2.1 Service Center/Village Workshops Loans In-
Process at Governorate Banks and Within the
Project as of 30 June 1983 in L.E.

	<u>Loan Value</u>	<u>Expended</u>	<u>Balance</u>	<u>Loan Value</u>
A. Bank Approved/Committed				
1. Service Center				
a. Mr. Moshen Azmy	250,000	82,500	167,500	
2. Village Workshop				
a. 14 loans	<u>345,981</u>	<u>209,981</u>	<u>136,000</u>	
3. Subtotal	595,981	292,481	303,500	595,981
B. Loans at Governorate Banks				
1. Service Center				
a. Hamany				195,000
b. Ghgralla				200,000
c. Agizy				250,000
d. Shokry				250,000
e. Diabex				250,000
f. Mahigobe				107,000
g. El-Zomere				224,600
h. El-Raheem				250,000
i. CCC Company				<u>250,000</u>
				1,976,600
2. Village Workshops				
a. 12 loans				<u>261,900</u>
3. Subtotal				2,238,500
C. Loans at the Project				
1. Service Center				
a. Quorah				250,000
b. Azame				250,000
c. Kokase				<u>250,000</u>
				750,000
2. Village Workshops				
a. 10 loans				<u>195,250</u>
3. Subtotal				945,250
D. Summary (LE)				
1. Bank approved/committed				595,981
2. Bank in-process				2,238,500
3. Project in-process				<u>945,250</u>
4. Total				3,779,731
5. Fund value (LE)				4,158,400
6. Uncommitted (LE)				<u>378,669</u>
		<u>Service Center</u>	<u>Village Workshop</u>	
		250,000	345,981	595,981
		1,976,600	261,900	2,238,500
		750,000	195,250	945,250
		<u>2,976,600</u>	<u>803,131</u>	<u>3,779,731</u>

- b. Sixty-eight percent of the fund is in the hands of the Governorate banks.
- c. Ninety percent of the Fund is either in-process at the banks or at the Project.
- d. Loan activity currently involves 36 village workshops and 13 service centers.

2.6 Land Improvement Subproject

Activities in this subproject concentrated upon field demonstration programs with EWUP and in two Project village basins: Abou Askar and El-Beck. In addition, integration with extension activities began and training started for drivers and mechanics who will operate the demonstration equipment in Minia, Beni Suef, and Fayoum Governorates.

1. Field demonstrations: completed landlevelling with EWUP and in Abou Askar basin; started work in El-Beck basin.
 - a. Farmers in the EWUP area reported a 30-40 percent reduction in irrigation time with the traditional small basins.
 - b. Farmers with long furrows reported a 75 percent reduction in irrigation time.
2. In Abou Askar basin, cooperated with extension unit in developing long furrow irrigation demonstration.
3. Training program for demonstration equipment.
 - a. Objective: 75 trainees in the three demonstration governorates of Minia, Beni Suef, and Fayoum.
 - b. Mechanics: currently underway in Maamoura with Minia people in the Level II program and Beni Suef and Fayoum trainees in the Level I program.
 - c. Drivers: 20 Minia drivers at Nubaria Training Center. Program consists of one week training in the governorate, one month at the training center, and additional field training with laser equipment at LISP sites.
4. Extension training.
 - a. Training manual in preparation for October/November program, which will be a field-lecture program conducted with Land Improvement personnel.

2.7 Local Manufacturing Program

1. Trained thresher operators through an assembly and testing program.

2. Designed a manual feeder for the thresher.
3. Four prototype machines tested in wheat and barley:
 - a. Sustained a machine capacity of four feddans per hour.
 - b. Straw length acceptable to the farmer.
 - c. Less grain damage than the existing Beheira thresher.
 - d. Total losses at an acceptable level.
4. Local manufacturing advisor recommended limited manufacturing production of this thresher incorporating modifications from this prototype testing.
5. Preparation for testing thresher in beans and peanuts.

3.0 FINANCIAL AND TECHNICAL LEVEL OF EFFORT

3.1 Financial Level of Effort

Table 3.1 summarizes the financial effort of the Project: 19 percent of the funds have been physically expended, 27 percent are in the pipeline, and 46 percent are in the pipeline/expended category. This compares to a project of 20 percent, 19 percent, and 39 percent respectively for the end of this reporting period. Thus, the Project is meeting its projected expenditure schedule for this year and exceeding its pipeline schedule.

3.2 Technical Level of Effort

Table 3.2 summarizes the technical level of effort, which totaled 341 man months, as compared to 364 anticipated man-months. Two positions remain unfilled: Senior Accounting Advisor and Machinery Development Advisor.

The Senior Accounting Advisor's vacancy is waiting MOA approval before filling. And a three month TDY in the latter position may lead to filling this slot for one year. Approximately four man-months were added to short-term TDY positions: Dr. Albert Trowse, a soils expert, for one month, Mr Al Blanshine, an agricultural research engineer, for three months.

4.0 IMPLEMENTATION ISSUES

Implementation was slow this quarter partly due to Ramadan. During the first part of the quarter, literage restriction on vehicles reduced field activities, especially extension (Annex A.3, May, A.3.8). A relaxation of this requirement during the latter part of this quarter did improve field contact.

Due to bureaucratic procedures, Project cash needs were delayed. This postponed training center activities and delayed the procurement of demonstration equipment needed for the spring row-crop season. "Ad hoc" extension activities affected the implementation of village extension programs. Also "ad hoc" assignments for Planning and Evaluation personnel has slowed the processing of farm management data.

Inadequate transportation has limited extension supervisory personnel in Cairo and delayed field evaluation planning and land improvement engineering surveys.

Development of the Gabal Asfar demonstration/training farm has been delayed because of slow equipment procurement and the slow removal of trees from the fields.

The principal implementation issue regarding the Service Center/Village Workshop program is land registration. Until this bottleneck is overcome, service center loan approval at the banks will be slow.

Project Management has taken action to correct these problems: (1) fuel allotments have been increased, (2) both extension staff and farm management data collation personnel have been increased, (3) vehicle usage is underreview, and (4) Gabal Asfar personnel have greatly increased their working hours to compensate for the above delays.

Table 3.1

Financial Level of Effort: Foreign and Local Currencies
From 15 September 1980 Through 30 June 1983

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Grant Agreement	USAID Obligation	Funds Available Balance	Funds In-Process (USAID, MOA)	Funds In-Process (FBDAC)	Funds In-Pipeline (3+4+5)	Funds Expended	Pipeline/Expended Funds (6+7)
Foreign Currency (US\$)								
1. Technical Assistance	6,424,000	5,955,618	3,111,454	347,360	---	3,458,814	2,496,804	5,955,618
2. Commodities	9,133,000	9,133,000	---	1,135,625*	---	1,135,625	393,436	1,529,061
3. Training	2,023,000	2,023,000	---	452,400	---	452,400	8,410	460,810
4. Research Support	1,005,000	1,005,000	---	---	---	---	192,459	192,459
5. Special Studies & Evaluation	215,000	215,000	---	---	---	---	12,452	12,452
6. Subtotal	18,800,000	18,331,618	3,111,454	1,935,385	---	5,046,839	3,103,561	8,150,400
Local Currency (US\$ Equivalent)								
1. Technical Assistance	2,302,000	1,665,283	796,842	---	---	796,842	868,430	1,665,272
2. Commodities	2,000,000	4,000,000	---	872,904	---	872,904	1,679,112	2,552,022
3. Training	1,000,000	1,000,000	---	257,674	---	257,674	271,121	528,795
4. Vehicle Operating Expenses	100,000	100,000	12,996	---	---	12,996	11,295	24,291
5. Facilities	70,000	70,000	---	---	---	---	---	---
6. Credit Funds								
a. Service Center	5,000,000	5,000,000	---	---	2,357,381	2,357,381	243,251	2,600,632
b. Waterlift	2,000,000	2,000,000	---	500,000	---	500,000	1,356,606	1,856,606
c. Machine Introduction	2,000,000	2,000,000	887,553	---	---	887,553	112,447	1,000,000
d. Uncommitted	4,000,000	2,000,000	---	---	---	---	---	---
7. Research Support	2,000,000	2,000,000	196,475	---	---	196,475	75,409	271,884
8. Special Studies/ Evaluation	728,000	728,000	15,294	---	---	15,294	3,457	18,751
9. Subtotal	21,200,000	20,563,283	1,909,160	1,630,578	2,357,381	5,897,119	4,621,134	10,518,253
OVERALL	40,000,000					10,943,958	7,724,695	18,668,653
						27%	19%	46%

* Land Improvement IFB in-process since September, 1982

Table 3.2

Level of Effort: Technical Staff From 15 September 1980 Through 30 June 1983 In Man-Months			
Position	Starting Date Day/Mo/Yr	Actual Effort	Anticipated Effort (1)
1. Team Leader	4/10/80	32.9	33.0
2. Planning/Evaluation Advisor	15/ 9/80	33.5	33.5
3. Research Director	3/11/80	32.0	32.0
4. Evaluation Advisor	7/12/80	31.0	31.0
5. Extension Advisor	4/ 2/82	23.0	30.0
6. Farm Management Advisor	15/ 4/81	24.0	24.0
7. Service Center Director	9/ 4/81	26.7	26.0
8. Equipment Repair Advisor	3/ 6/81	25.8	26.0
9. Soil Improvement Director	13/ 7/81	23.6	24.0
10. Training Advisor	9/ 9/81	21.7	23.0
11. Machinery Development Advisor	5/ 1/82	12.0	18.0
12. Local Manufacturing Advisor	3/ 2/82	17.0	18.0
13. Soil Improvement Irrigation Eng.	1/ 4/82	15.0	22.0
14. Senior Accounting Advisor	1/11/82	7.0	8.0
15. Short Term Technical Assistance		<u>16.0</u>	<u>16.0</u>
		341.2	364.5

NOTE:
(1) As reflected in the
Inception Report, p. 52

5.0 NEXT QUARTER'S OBJECTIVES

5.1 Overall Objectives

1. Expended funds should reach the 27% level and pipeline/expended funds should reach the 50% level.
2. Finalize extension/training IFB for stateside bidding.
3. Receipt and clearance of land improvement equipment.
4. Clear obstacles to the Service Center Fund's development.
5. Finish disbursement of the third tranche of the Water-lifting Fund.
6. Prepare cash needs for the fall quarter.

5.2 Planning and Evaluation

1. Complete Working Paper No. 10, "A Partial Economic Analysis of Mechanized Wheat Production in Selected Project Villages".
2. Complete Working Paper No. 11, "Long-Term Berseem: Crop Enterprise Budget and Mechanization Impact".
3. Farm management study: Complete maize data collation and start cotton and rice.
4. Conduct farmer interviews for wheat mechanization evaluation: grain drills, mower/binders, mowers, and combines.
5. Continuation of tractor survey data collection.

5.3 Research and Development

1. Monitor plots: peanuts, cotton, and maize.
2. Design potato and subsoiling experiments.
3. Develop minimum tillage plans.

5.4 Extension/Training

1. Continue infrastructural development for Gebel Asfar demonstration/training farm.
2. Fully implement observational study tour program.
3. Order groups 2 and 3 demonstration/training equipment.
4. Develop draft plan for Gianacelis Training Center.
5. Complete combine distribution.

6. Continued development of extension workplans in the Project Villages.

5.5 Land Improvement

1. Concentrate upon additional equipment procurement: local procurement and IFB needs.
2. Complete landlevelling and long-furrow demonstration at El-Beck basin and other selected areas.
3. Coordinate with extension the basin selection process for the Project Villages in Minia.
4. Continue the mechanics and drivers training program.
5. Continue the survey program.

5.6 Service Center/Village Workshop Development

1. Move an additional L.E. 500,000 into the banks bringing the total to L.E. 2,700,000 at the banks.
2. Continue to develop new business and monitor workshops procurement.

5.7 Local Manufacturing Program

1. Prepare final drawings of the semi-mounted axial flow thresher.
2. Start demonstration local manufacturing facility at Gianaclis.

-17-

ANNEX A

TABLE OF CONTENTS

A.1	PLANNING/EVALUATION SUBPROJECT	18
	A.1.1 Planning & Financial Unit	18
	A.1.2 Evaluation Unit	27
A.2	RESEARCH AND DEVELOPMENT SUBPROJECT	36
	A.2.1 Research Program	36
	A.2.2 Machinery Development	45
A.3	EXTENSION/TRAINING SUBPROJECT	46
	EXTENSION UNIT:	
	A.3.1 Extension Advisor	68
	A.3.2 Field Extension Officers	71
	A.3.3 Extension Information Unit	80
	A.3.4 Gebel Asfar	83
	TRAINING UNIT:	
	A.3.5 In-Country Training Officer	87
	A.3.6 Participant Training	92
	A.3.7 Fiscal Report	96
A.4	SERVICE CENTER/VILLAGE WORKSHOP SUBPROJECT	
	A.4.1 Service Center Development Program	98
	A.4.2 Village Workshop Development Program	105
A.5	LAND IMPROVEMENT SUBPROJECT	108
A.6	LOCAL AGRICULTURE MANUFACTURING PROGRAM	126

A.1 PLANNING/EVALUATION SUBPROJECT

A.1.1 Planning and Financial Unit

Activity Report
April and May, 1983

Submitted by: Steven C. Shepley
Zaki Helmy Zaki Wissa
Mohammed Shoukry
Nour El Din
Moustafa Abou El Ella

Summary:

Processing of the Farm Management Survey data for Long Term Berseem was completed together with processing of half of the wheat data. Two technical papers were prepared and submitted as project working papers and for a professional conference held at Manoufia University during the first week of May. A survey of wheat yields from mechanically and traditionally planted crops was designed and conducted in Beheira, Ghabria, Qalubia and Sharkia Governorates. Continuing accounting supervision for the technical assistance and project local currency accounts was provided.

Farm Management Survey Data Analysis:

The statistical processing of the survey data is progressing steadily but slowly. During the reporting period, processing of the long term berseem data was completed with preparation of crop enterprise budgets according to the four prevailing methods of seedbed preparation (animal, mechanical, labor intensive and none) and the two existing tenure conditions (rented and owned). These budgets were developed into detailed tables listing all variable cost and return inputs, fixed costs and profit margins of returns above variable and fixed costs for each of the tenure and seedbed preparation conditions. Each crop enterprise budget contains 351 entries and there are 38 tabular budgets to cover the tenure and seedbed preparation conditions for each of the five farm size classifications into which the survey data have been stratified. The work completed for berseem also includes bar graphs showing the labor source distribution (family and hired) for each operation in the production process and the current status of mechanization for all operations. As the budgets include input-output physical quantities and costs, the coefficients derived therefrom shall be used as technical coefficients in subsequent modelling procedures. The budgets and graphs shall be included in the Farm Management Report upon completion of all of the data analysis.

Processing of the berseem data together with preparation of the statistical tables and graphs has taken 11 weeks. As stated in separate memoranda for project management, the data processing is proceeding quite slowly due to insufficient numbers of data analysts and computer operators and to the fact that the second HP series 80 mini-computer ordered last January

has not arrived. Another factor inhibiting progress is the frequent assignment of key staff members to perform various ad hoc tasks unrelated to the survey work, which frequently causes operations to be suspended for various periods required for these activities. The last and final contraining progress concerns frequent power interruption, particularly during the hot months which cause the computer to be shut down for periods ranging from one to three hours at a time. The Sub-unit has requested assistance from project management to procure a standby power unit, but this request has not yet been honored. The Sub-unit staff are currently in the middle of preparing the sample statistics for the wheat data, which is about half complete at this point in time.

Technical Reports:

During the reporting period, two technical reports were prepared from analysis of the Farm Management and other survey data previously collected by the Sub-unit. These reports are attached and summarized below.

a. Reducing Maize Losses through Optimizing the Date of Planting - A Simulation Model and Economic Analysis:

There has been found a highly significant correlation between maize yields and planting dates in the Egyptian Nile Delta. Experimental data with yields (dependent variable) and dates of planting (independent variable) were used in the development of a cubic regression equation for predicting yields and losses at various planting times.

This routine and a planting date probability density function from the Farm Management Survey of a berseem-maize rotation were used to construct a maize loss simulation model. The model generated a loss frequency distribution for the samples area. The model was validated through comparison of results with the sample statistics and was found to be very accurate.

An economic and financial analysis was performed to compare the opportunity costs of foregoing part of the berseem yield with increased income from timely planting of maize. It was found that the lost income from giving up the fifth cutting of berseem exceeded the increased income from planting maize on the optimum date (May 2nd). Therefore, it was concluded that maize plantings should occur on or about June 1st (after the fifth berseem cutting). In following this recommendation, farmers in the sampled area would be able to increase their net returns from maize from 20 to 130 Egyptian pounds per feddan without losing, without foregoing any berseem income and without making any other input or environmental changes.

b. Opportunity Cost of Animal Labor in Egyptian Irrigated Agriculture

The opportunity cost of animal labor used for irrigation in terms of foregone milk, meat and calf production is substantial. A statistical survey of 130 randomly selected sakia units powered by lactating buffalo and cattle showed a significant difference in product output between working and non-working animals. Non-working buffalo were found to yield an average 1.02 kilograms more milk per day, to show an increase in live market weight of 67 kilograms, and yield an additional calf over their productive life span than their non-working counterparts. For working cows, the mean product output losses were found to be 0.81 kilograms of milk, 16.38 kilograms of meat and one calf respectively.

Translated into 1982 product prices, these losses represent an hourly animal labor opportunity cost of L.E. 0.25 for cows and L.E. 0.35 for female buffalo used in irrigation.

Wheat Yield Survey:

To evaluate the economic and financial costs and returns of mechanical planting of wheat, the Sub-unit designed and implemented a yield survey in randomly selected villages of Beheira, Gharbia, Qalubia and Sharkia. The survey was conducted in conjunction with the Extension and Training Sub-Project. This latter entity planted, last winter, some 1,000 feddans in the project random villages with a grain drill and the purpose of the survey was to collect data to determine whether there are any significant differences between yields from mechanically and traditionally planted fields.

The survey procedure used was as follows: (1) 12 wheat fields were randomly selected from project villages in each governorate. There were six fields planted by grain drill and six by traditional hand broadcasting means; (2) in each field, four randomly selected one meter plots were harvested and threshed; (3) the total yield was weighed at site; (4) the grain yields were sealed in plastic bags and brought to Cairo for analysis; (5) in Cairo, the grain yields were first weighed and then fed into a moisture meter to determine moisture content. Altogether 48 fields were sampled with 1982 one meter plots.

The analysis, which is now underway, will adjust the grain and straw yields to dry weight (15% moisture). An analysis of variance shall be performed to determine whether or not the traditionally and mechanically planted yields are from the same statistical population. If the analysis shows, the populations are not statistically equal, sample statistics shall be calculated with means, variance, confidence intervals and t-tests. Assuming the statistical populations to be unequal and assuming that the mechanically planted yields are higher than the traditional planted, the benefits from mechanical planting shall be the yield differential multiplied by farm gate and inter-

national prices. From this a cost benefit analysis shall be performed to calculate the internal rate of return for this particular technology. Benefits are expected to include yield gains, seeding rate reductions and labor cost savings.

Fiscal Administration:

As usual, the Sub-Unit prepared accounting records, cash need statements and expenditure reports for the technical assistance contract and monitored the fiscal administration of project grant funds.

A.1 PLANNING/EVALUATION SUBPROJECT

A.1.1 Planning and Financial Unit

Activity Report
June, 1983

Submitted by: Steven C. Shepley
Zaki Helmy Zaki Wissa
Mohammed Shoukry
Nour El Din Nasr

Summary:

The work load was increased during the reporting period due to the need for Mr. Shepley to act as Team Leader during the absence of Dr. Gaiser. Principal activities included completion of the statistical processing of the wheat farm management data, preparation of a draft report on the economics of wheat mechanization, preparation of an expenditure report and cash need statement for AID supplied project local currency funds, preparing extensive comments on the USAID evaluation report, development of a five year planning project of mechanization extension funding requirements for the USAID sector project, preparation of an expenditure report and cash need statement for the water lifting credit fund, development of a final amendment to the Louis Berger International, Inc. technical assistance contract, working with the Extension Subproject to develop an invitation for bid document to procure additional extension equipment, and preparation of technical assistance contract foreign and local currency invoices.

Fiscal Administration:

With the departure of the senior accounting advisor, remaining subunit personnel have had to devote considerable time and effort to accounting and fiscal documentation. The requirement has resulted in a slowing down of other critical subunit activities. The principal victim of this diversion of attention is the economic analysis of mechanization systems. During the reporting period, detailed expenditure reports and cash need statements were prepared for in-country training, commodities, research, vehicle operating expenses evaluations and the water lifting credit fund. In addition, subunit economists have also had to become extensively involved in monitoring of day to day project accounts and preparing accounting documentation for the technical assistance contract.

New monies now in the approval process at USAID include: (1) L.E. 146,134.47 for in-country training; (2) 18,339.37 for commodities and; (3) 415,000 for the water lifting credit fund. To date 82% of the 830,000 already disbursed by AID for the water lifting credit program have been expended for approved equipment loans.

Farm Management Survey Data Processing:

Frequent power outages, lack of sufficient staff and computer hardware equipment, and inability of the Planning and Financial Advisor to devote full time and attention to the economic analytical work of the project because he is serving concurrently as accounting advisor has impeded the statistical processing of the farm management data. During the reporting period, processing of wheat data was completed and the subunit began processing of the maize data.

Draft Report on the Economics of Wheat Mechanization:

Data from the farm management and wheat yield surveys were analyzed and developed into a partial economic and financial analysis of wheat mechanization.

The report, which is now under final preparation, provides a quantitative assessment of the major benefit categories resulting from mechanizing wheat production operations. The analysis deals with two levels of mechanization: (1) current on-farm mechanized practices which were initiated prior to Project start-up and (2) costs and returns of mechanized operations introduced by the project. In the analysis, both on-farm (financial) and societal (economic) costs and returns were assessed.

To evaluate the productivity effects of existing mechanized operations in seedbed preparation and irrigation water lifting, a multiple regression analysis was performed with grain and straw yields as the dependent variable and with seedbed technology, water lifting practices, seed input, fertilizer input, planting and harvesting dates, labor input, and field size as the independent variables. Statistical significance tests were performed to determine whether alternative seedbed and irrigation methods significantly affect yields. It was found that there is no statistical significance on yields from mechanized, animal intensive and no seedbed preparation when traditional hand broadcast planting methods were used.

The benefits from mechanizing selected production operations introduced by the project fall into two discrete categories: (1) cost savings and (2) production increases. These net benefits after subtraction of technological production costs are summarized in the following table.

Table 1

Benefits of Selected Mechanized Operations Used in Wheat Production (TE/Feddan)		
Operation	On-Farm	Societal
Grain Drilling	82.19	188.33
Mechanical Water Lifting	6.26	7.39
Harvesting with Mower-Binder	16.29	- 19.27
Harvesting with Combine	35.26	37.38

From the analysis in the report, it would appear that all mechanized operations introduced by the Project are significantly beneficial except for harvesting by mower-binder when economic costs and returns are considered.

A major contribution of this report to the body of knowledge related to wheat mechanization is the "shadow pricing" of agricultural labor where the value of this output was derived from its productivity through use of the labor technical coefficient from the regression model and the free market price of the output. The analysis showed that the current value of the labor input is L.E. 0.073 per hour as compared with the domestic wage rate of L.E. 0.42 per hour. The domestic wage rate is considerably higher than its value as a factor of production because of prevailing labor shortages.

Comments on the USAID Evaluation Report:

The long awaited evaluation report finally arrived. It was carefully reviewed and found wanting in a number of important areas. First of all, the report was found to be without depth and offered little useful insights for project improvement that management was expecting. The report also contained numerous factual errors and misinterpretation and in spots was wildly speculative without factual basis. It was generally felt that the three weeks allocated for evaluation of this complex project was far too short to examine project activities in any meaningful depth. Also, it was noted that the evaluation participants were all generalists and that a project of this nature requires specialized expertise. A twelve page critique of the evaluation was prepared and submitted officially to USAID for inclusions as an annex to the report. On Wednesday, June 16th a meeting was held at AID to discuss our comments on the report. Those in attendance agreed with our findings.

Budget Projections for the USAID Sector Approach:

At the request of project management and the Ministry of Agriculture, the Subunit prepared a comprehensive overview of machinery extension funding requirements. The package included a complete copy of the Egypt Five Year Mechanization Plan where goals were established to replicate the pilot machinery and demonstration programs launched under the Agricultural Mechanization Project in an area of 500,000 feddans. This area is to be sub-divided into discrete machinery rental zones of 5,000 feddans each. Supporting the zone concept are also funds to provide service centers and credit facilities throughout the impetus of mechanization generated by the special zones. The Plan, which has been prepared by the Ministry of Agriculture and endorsed by His Excellency the Minister and the Cabinet, provides an official assessment of mechanization extension requirements and addresses all anticipated needs for capital investment, support facilities, credit funds, maintenance and repair infrastructure, personnel, operating costs and training installations. As such, the Plan is an integrated package of requirements designed to initiate comprehensive mechanization of agriculture throughout the cultivable land area of Egypt. The Plan has been structured to take account of actual needs

based upon actual cropping patterns prevailing in the country and has been specifically tailored to suit individual crop production requirements as well as the requirements of general agriculture.

The sectoral budget prepared in support of the Plan is summarized in Table 2.

Table 2

Planning Budget for Sectoral Machinery Extension Activities (\$US 1983)	
Demonstration/Training Equipment	49,431,000
Credit Funds	
- Workshops	40,100,000
- Machinery	408,098,000
Support Equipment	19,900,000
Personnel Incentives	99,900,000
Operations	8,340,000
Training	36,128,000
Training Centers	25,000,000
	<u>686,897,000</u>

Details of this budget project are shown in the package submitted to USAID on June 22, 1983.

Concurrent with the budget submission, the Subunit, in cooperation with the Evaluation Subunit prepared a sociological assessment of machinery extension programs. In this assessment, it was stated that machinery extension is quite new to the Egyptian agricultural production environment and that a strategy has only been formulated and introduced in selected areas of the country targeted for input from the Agricultural Mechanization Project. As machinery extension is a recently introduced and evolving activity within selected areas, our comments were limited to actual results of our pilot activities and could not be extrapolated, at this time, to general observations about the nationwide extension effort.

We have found from our experience in selected areas where we are conducting mechanization extension activities with adequate management structures, training programs and capital inputs that results are promising. In these areas, farmer response has been quite positive and the information spread effects have gone well beyond the original operational areas. Internal evaluations of these efforts have validated our pilot machinery extension models to the extent that we are confident they can be replicated in much larger areas throughout the country. The sectoral budget for machinery extension will provide the human, material and infrastructural resources to replicate successful machinery extension models throughout the country.

In this regard, it should be noted that machinery extension is a unique activity, requiring specialized inputs of personnel, capital investments and management structures necessitating a separate functional identity from general extension programs.

This is required because of the specialized training and orientation of machinery subject matter specialists emphasizing an agricultural engineering focus as well as agronomics. Moreover, machinery extension programs also require close and cooperating links with the private sector and with specialized prototype development activities not usually found in general extension programs.

Placing mechanization extension within the general extension effort will only fragment operational links between applied research, the private sector, and the required engineering focus which would result in an ineffective field program.

Further expansion of these comments were submitted to USAID on June 23, 1983.

Invitation for Bid Documents:

Working in conjunction with the Extension Subproject, a complete Invitation for Bid document together with specifications for tractors and farm implements was prepared to procure additional extension equipment from the commodity line item of the Project foreign currency budget. This document is being reviewed by appropriate Ministry procurement committees and shall be advertised shortly. The estimated procurement amount is \$US 3.6 million.

Problem Areas:

The absence of a Senior Accounting Advisor is requiring considerable time and effort on the part of Subunit economists in the financial management of the project. In addition, the departure of the previous incumbent for this position has left the project with only one junior accountant on the staff to administer all of the Project's financial affairs. To keep accounting records in an orderly fashion and up to date, it is considered essential that a permanent staff of at least one senior and two junior accountants be recruited and employed. This will serve to fully meet Ministry and AID auditing requirements and free up the valuable time of the limited economic staff to perform more substantive analytical work.

A.1 PLANNING/EVALUATION SUBPROJECT

A.1.2 Evaluation Unit

Activity Report
April, 1983

Submitted by: Peter Reiss
Raafat Lutif
Aiman El Tuns

Working Paper No. 9: Agricultural Mechanization and Labor - A Look at the Demand and Supply Sides:

A working paper has been written on labor and agricultural mechanization by the Evaluation Advisor, Zakaria El Haddad, and Abdel Tawab El Yamani. Raafat Lutfi did all of the computer work. In summary, it makes the following points:

1. Given the present low level of mechanization, there is a continuing reliance on hired labor for most agricultural operations. The expansion of mechanization in the future may mean displacement however.
2. The vast majority of emigrants interviewed were landless or near landless, contradicting one theory that it is only the prosperous Egyptians who emigrate abroad.
3. While they themselves are not formally educated, emigrants prefer to keep their sons in school rather than have them work the family's landholding.
4. Emigrants in the study largely depended upon other household members to work the land, suggesting a preference for older children or siblings.
5. The vast majority of emigrants worked in agriculture in some capacity prior to leaving the village, yet few worked in agriculture in their new location. Less than half of the return emigrants chose to work in agriculture during their breaks in the village, showing a decided trend away from participation in such work.
6. No emigrants received training in their work outside the village and so were not returning with new skills to assist Egypt in the future.
7. Remittances are largely used for house-building and the purchase of consumer goods. While there was some interest in purchasing land, interest in purchasing agricultural machines or starting food projects was marginal.

Preparation for Silage Mower Evaluation:

A number of conversations were held with Fred Schantz and Mohamed Abdel Aziz about the Extension Unit's distribution and use of silage mowers to cut cotton stalks in the Delta. The evaluation will be conducted in mid-May.

Observation Tours for Members of Evaluation Unit:

Two observation tours were designed. One is to the United States and includes time at the World Bank, at the University of California at Davis, and in the southwest at Arizona and New Mexico. The other is to the Philippines (IRRI) and India (ICRISAT).

Evaluation of the Machinery Introduction Fund:

Dr. Gaiser and Fred Schantz have asked the Evaluation Unit to undertake an evaluation of the Machinery Introduction Fund. At issue is why farmers who are from the Project villages are not taking out loans while those from outlying areas are. One suggestion is that farmers in Project areas believe that the Project will fulfill all of their machine needs free of charge and that they will not need to purchase machinery themselves. This evaluation will be done in June, following a visit to Minia.

Studies of Farmer Adoption Rates:

Dr. Abdel Tawab El Yamani has requested Dr. Mesbah to design a study of farmer adoption rates for rice transplanters and Dr. Abdel Maksoud to investigate the same issue with combines. The designs have not been discussed because Dr. Abdel Tawab and Dr. Habashi were out of the country for much of the period.

Report on Labor Situation:

Dr. Abdel Tawab has requested Mahmoud Mesbah and Peter Reiss to draft a study of the labor situation in the Project Villages. This report ought to build upon Working Paper No. 9.

Counterpart Reassignment:

Nour El Din Nasr was initially reassigned by Dr. Zakaria El Haddad to work with him on a computer study of the effect of the postponement of planting dates on crop yields. However, since Steven Shepley was already working on the same subject independently, Nour El Din has been assigned to work with him. Nour will still manage the evaluation budget.

Participation of Eng. Ali Nashat in Evaluation Activities:

Eng. Ali Nashat, former Deputy Director of the Project, has been asked by Dr. El Sahrigi to join the Planning and Evaluation Unit as a consultant. Since his role has not yet been defined, the Evaluation Advisor has suggested that Mr. Nashat take part in the series of anticipated evaluations of Project activities being undertaken by him.

Minutes:

Planning and Evaluation Subproject Committee Meeting held on 4 April, 1983. Attending: Abdel Tawab El Yamani, Mahmoud Mesbah, Bahgat Abdel Maksou, Steven Shepley, Peter Reiss.

1. Dr. Abdel Tawab asked Dr. Reiss to prepare the necessary forms for two observation tours through Training to the United States and Asia to be submitted to Dr. Zakaria El Haddad for his approval.
2. The issue of whether a third professor was needed for the research and evaluation was raised, and Dr. Abdel Tawab said that he would discuss the matter with Dr. El Sahrighi.
3. Dr. Reiss was asked to prepare letters for the release of funds for supplies and a change in the manner in which transportation allowances are provided to team supervisors.
4. The sample size of the tractor survey was discussed. Steven Shepley said that a running check on the variances and confidence intervals will be made to see if the data fit the sample size we have chosen.

Minutes:

Planning and Evaluation Subproject Committee Meeting held on 14 April, 1983. Attending: Abdel Tawab El Yamani, Mahmoud Mesbah, Bahgat Abdel Maksoud, Steven Shepley, Peter Reiss.

1. Dr. Abdel Tawab requested that certain members of the Committee be made responsible for writing reports for designing future research efforts. He asked Dr. Reiss to write a working paper on labor and mechanization. Dr. Mahmoud was asked to design a study of the rate of adoption by farmers of rice transplanters. He asked Dr. Bahgat to design a study of the rate of adoption by farmers of a combine.
2. The management of the work of Engs. Nour El Din Nasr, Aiman El Tunsi and Raafat Lutfi was discussed. Nour El Din has left the Evaluation Unit to work with Steven Shepley on a study of planting dates and will be responsible for the computer work and for visiting the libraries of agriculture throughout the country to collect everything that has been written about the subject so far. Aiman El Tunsi has been removed from his work on the labor material and will be working full-time for the coming year on the data from the tractor survey. Dr. Mahmoud showed him how to collate and record the data. Raafat will assist Aiman when necessary, particularly when it comes times to enter the data. Otherwise, he will continue his work with the labor data.

3. Dr. Abdel Tawab and Dr. Reiss agreed that in the light of the fine work that Raafat Lutfi has done in teaching himself to use the project computer, he ought to take a course in mini-computers given at Cairo University. A letter will be prepared for permission from Dr. Zakaria El Haddad.
4. Dr. Reiss discussed the evaluation of silage mowers and grain drills demonstrated by the Extension and Training Components as requested by Dr. David Gaïser.

A.1 PLANNING/EVALUATION SUBPROJECT

A.1.2 Evaluation Unit

Activity Report
May, 1983

Submitted by: Dr. Peter Reiss
Eng. Aiman El Tunsi
Eng. Raafat Lutfi
Eng. Nour El Din Nasr

Evaluation of Silage Mowers:

In mid-month, the Evaluation Advisor visited four project villages with staff members of the Village Studies Program in order to interview farmers about the reactions to a silage mower used for cotton stalk removal. Those accompanying the Evaluation Advisor were the two field managers for the four Delta governorates. In each of the villages visited, they were met by the village monitors working in those areas.

Farmers, interviewed in their homes, were asked about their opinion of the silage mower and interest in continuing its use during the coming year. Of interest was whether its use during this one season had any noticeable effect on cropping patterns or on their willingness to grow cotton again. The Extension and Training Component has asked that we question farmers about the usefulness of the Project's village-level mechanization experts and in their interest in seeing other tools demonstrated in the future.

While farmers uniformly said that the silage mowers did the work in a shorter amount of time than the traditional methods of cutting the stalks with a hand-held hoe (faz) or pulling the stalks out by the roots after the field had been flooded, they found that the performance of the tool was unacceptable. The silage mowers cut the stalks at a height of at least five centimeters above ground level. Since the stalks are used for fuel for bread making primarily, farmers complained that an important part of the stalk was left in the fields. Some hired children to cut the remaining piece once the machine had left the fields.

All of the farmers interviewed preferred a tool which could pull the stalks out by the roots, as the preferred traditional method did. However, farmers did say that they would use the mowers again if no laborers were available the following year. They suggested a rental charge of roughly 5 L.E. per feddan for the tool, with the tractor charge additional.

Based on the report, the following recommendations were made:

1. While the silage mowers demonstrated were received with general dissatisfaction, farmers interviewed did make the point that it was better than not having hired laborers. Therefore, the implement ought to be

demonstrated also following the next cotton harvest. As the shortage of workers intensifies and wages increase dramatically from year to year, farmers may feel more compelled to take advantage of the mowers. As in most other activities, there is a trade-off of advantages and disadvantages.

2. Since the mowers can also be used for a number of other crops (including berseem, soy beans, and lentils), it would be advisable to test them widely. Apparently, the tool has been used only for cutting cotton stalks to date. Farmers thought that it might be more acceptable for other crops.
3. Serious attention ought to be given to alternative technologies, particularly to implements which pull the stalks from the ground rather than cut them at the base. Agro-Products, an English company, already produces a cotton stalk puller which it would be prepared to adapt to Egyptian conditions. Since such arrangements might require a long period to be finalized, if at all, it is strongly recommended that the Project acquire one unit and begin demonstrations and possible adaptations.
4. The activities and behavior of the village-level extension experts requires attention by that Component. Farmers expressions of frustrations and anger with these representatives of the Project are troubling and ought to be resolved immediately so as not to threaten future efforts.

Copies of the report, the first in a series of machinery demonstration evaluations, has been given to Project Management, the Chief of Party, the Extension and Training Coordinator, the Financial Advisor, and to members of the Evaluation Committee.

Transportation Difficulties:

Since mid-January, the Evaluation Unit has not had access to a Project vehicle, on a regular basis. Attempts to use a Project car for field trips were fruitless because no free vehicles were available. As a result, two long trips to the Delta for the purpose of evaluating the water-lift loan fund and the operations of the silage mowers were made using public transportation. Buses, taxis, trucks for hire, and donkey carts were used by the Project staff. Per diem funds were used to pay the costs. While feasible, the use of public transportation, requiring several connections and waits, delayed the team and lengthened the trips in all instances. A trip from Tanta, where the team was based since it is a central location, to El Sadiine in Sharqia took more than three hours each way using several buses and taxis, while the trip ought to take roughly one hour by car.

Given that the Evaluation Unit has been asked to conduct a number of evaluations which required travelling to the field

on frequent occasions, it seems advisable that it be given full-time use of a Project vehicle, or, at the least, access to a Project vehicle, with or without a driver, whenever it is necessary.

Basin Study in Minia:

Although the information was long ago requested by the Soil Improvement Component and a research design was written in December, no work has as yet been undertaken. Questions that had been proposed by the Component were, in fact, presented to the Evaluation Committee by the Evaluation Advisor and the request that he be permitted to undertake the work with members of the Minia team of the Village Studies Program was made. The request was refused. The matter will be raised again.

Tractor Survey:

Aiman El Tunki has been occupied collating and coding data received from the village monitors collecting the data. There has been a question raised by Raafat Lutfi about usefulness of this operation since he has found that the original data sheets are sufficient for entering the data into the computer.

Planting Dates and Crop Yields:

Nour El Din Nasr has spent the period working with the Planning Unit on a study of planting dates at Dr. Zakaria El Haddad's request.

Follow-up for June, 1983

The Evaluation Unit intends to undertake a study of Project interventions in wheat planting and harvesting, evaluating the success of a seed drill, mower/binder, and combine used by the Extension and Training Component.

Members of the Unit expect to visit Minia Governorate to see the progress of the work and, hopefully, begin the study of the basins per the request of the Soil Improvement Component.

A.1 PLANNING/EVALUATION SUBPROJECT

A.1.2 Evaluation Unit

Activity Report
June, 1983

Submitted by: Peter Reiss
Aiman El Tunsi
Raafat Lutfi
Nour El Din Nasr

Mechanized Wheat Cultivation Study:

The Planning and Evaluation Committee, in a meeting held during the period, supported a plan whereby the Evaluation Advisor is to visit project sites and review efforts to introduce machinery for wheat planting and harvesting. The Training and Extension Component has demonstrated seed drills, mower/binders, and combines on farmers' land. The evaluation of the machinery will be undertaken at the same time because planters and harvesters tended to be used on the same plots.

In studying the seed drills, of concern is the difference in labor, time, and cost requirements for traditional and mechanized methods and the organization of these inputs by farmers. These same concerns will be reflected in reviewing the success of the harvesters. In addition, farmers will be asked how they believe the use of the machines may be expanded with involvement of private custom operators. Dr. Zakaria has asked the Evaluation Advisor to visit those areas worked by a mower used by another project to see if farmers react differently to the mower and the mower/binder.

A number of Project sites and non-Project sites will be visited. While the planters and harvesters were used in Project villages, most of the combines were not. Furthermore, the mower was used outside these areas.

Although, it was intended that the visits to be the areas be made during Ramadan, immediately after the committee meeting, no transportation was available and no visits made. The rigors of Ramadan precluded any trips because members of the Project, both those stationed in Cairo and in the governorates, could not travel taking public transportation, as the Evaluation Advisor has done on two previous occasions to evaluate the water-lift loan fund and silage mowers.

The postponement of the visits to the villages for the study of mechanized wheat cultivation underlines the importance of transportation to those who must make regular trips out of Cairo and the difficulty in undertaking work without it. Members of the Evaluation Unit have been without Project transport since January, and the use of public transportation is inefficient and counter-productive.

As a result of the transportation problems, the visits will have to be postponed until July and August.

Social Analysis Component for Agricultural Sector Paper:

At the request of the Project Director, the Evaluation Advisor wrote the social analysis component for an agricultural sector paper on mechanization to be used by AID for future funding allocations.

Review of the Literature on Agricultural Mechanization in Egypt:

As the follow-up to an initial review of the literature on agricultural mechanization written earlier by the Evaluation Advisor, a final report is being prepared. New reports are being collected and reviewed.

Tractor Survey:

Aiman El Tunki and Raafat Lutfi have been occupied with the tractor survey. Aiman has spent the month tabulating the data after collating it. Raafat redesigned the method for its collation and has begun entering data in the computer.

Follow-up:

1. With the anticipation that appropriate transportation may be found during the coming period, the Evaluation Advisor expects to interview farmers for the wheat cultivation study accompanied by Raafat Lutfi.
2. The study of three basins in Minia governorate will be presented to the committee a second time. With its support, the study will begin with the involvement of the Evaluation Advisor and Nour El Din Nasr in August in the three villages in Minia.
3. Nour El Din Nasr and the Evaluation Advisor have discussed the usefulness of undertaking a limited survey in the Project villages which is based on the evaluation of the water-lift loan fund report. The point is to take a study which was done on the basis of a few days in three Project villages and expand it to include all of the areas in which loans have been awarded to get a broader picture. One of the purposes of these short reports is that they can serve as the basis of larger studies where necessary. Although not all of them will be expanded, some may be made into larger scientific studies. With the committee's support, the expanded study of the loan fund will be undertaken in the Delta while the basin study in Minia is being conducted.
4. Drs. Bahgat Abdel Maksoud and Maksoud Mesbah have agreed to prepare a questionnaire to examine "adoption rates" of farmers.

A.2 RESEARCH AND DEVELOPMENT SUBPROJECT

A.2.1 Research Program

Activity Report
April, 1983

Submitted by: Carl A. Reaves
Samir M. Younis

Progress:

Completed the secondary tillage, leveling, and planting cotton in Sakha. Finally got two tractors and measured draft requirements for the different implements. All the test plots were planted by the Sakha Experiment Station equipment and personnel. We did plant an area outside of the test plots by the Israeli four row planter with two Israeli planting units and two planting units that were manufactured locally. The Israeli units performed satisfactorily but the local manufactured units had failures of sprockets and chains.

Rough drafts of reports for potato digging and tillage tests in West Nubaria were completed. Trowse and Dr. Araby completed their one month investigation of the existing conditions of plant root environment. Trowse completed the rough draft of his final report and we are now typing it in Alexandria. Trowse requested a copy when the typing is finished in order to correct and make minor revisions, so we will forward a copy to him. Attended four Executive Committee meetings, plus spending considerable time writing suggestions for modifications and details of the Kom-Ombo proposal sugar cane project. Started developing a proposed research project on the effects of different crop row spacings on yield.

Visited the Ministry North Tahrir Company and discussed with Eng. Mahmoud Nassif the possibility of establishing tillage tests. Preliminary agreements were made and an area was selected to install the experiments, but it was later decided to move the test area to the Training Center in Gianaclis. Visited this Training Center on April 30 and located an area of 20 feddans to install tillage experiments with maize. Dr. Zakaria was in Gianaclis at this time and asked us to also install tests on 13 feddans, that had already been tilled, to determine the effect of planting maize three different ways. Maize is to be planted on the level and cultivated on the level, on a ridge and cultivated on a ridge, and in a furrow but cultivated to a ridge. Date of delivery of the Ford Tractors is very doubtful so personnel at the Training Center agreed to locate tractors locally that we can rent.

Dr. Zakaria discussed with us plans to install four different types of irrigation systems on the Training Center property with Research and Development money.

Drs. Sahrigi and Gaiser met with the Executive Committee to discuss operations and ways to accelerate procedures. Visited

West Nubaria on April 16 to look at the peanut experiment. Irrigations had been made on a four-day interval and this was not often enough to germinate the nuts uniformly, so it was requested that irrigations be made on a two-day interval. A lot of alfalfa plants had not been killed by the tillage, especially in the shallower tilled plots. Approximately 10% of the peanuts had germinated and some alfalfa plants had grown to four inches high, so I suggested that the alfalfa be sprayed with an appropriate herbicide with the use of our precision sprayer. Visited the peanut experiment again on April 30. The herbicide had not been used and some of the alfalfa was approximately 25 cm. high and with the increased irrigation approximately 75% of the nuts had germinated. It was decided that the best alternative would be to stop growth of the alfalfa between rows with our mini-disk and remove that within rows by hand labor. By the time the mini-disk was delivered to West Nubaria some alfalfa was 30 cm. high. The disk was tried on one or two rows but it was then decided to use hand labor to remove all alfalfa.

Major Activities for May:

Start mechanical cultivations and spraying of the peanuts plus take penetrometer readings between rows and within rows to evaluate compaction by machinery, closely follow progress of the cotton experiment, and install tests with maize at Gianaclis.

A.2 RESEARCH AND DEVELOPMENT SUBPROJECT

A.2.1 Research Program

Activity Report
May, 1983

Submitted by: Carl A. Reaves
Samir M. Younis

Progress:

Initiated mechanical cultivation of the peanuts in West Nubaria with the 4-tine rolling cultivator. We failed to spray the alfalfa still remaining from the previous crop with a herbicide. Before the mini-disk harrow was delivered to the field the alfalfa had grown too much and had to be cleaned out by hand. The rolling cultivator did an excellent job of cutting the alfalfa plants and adding soil to the plant row. Detailed plans were made to start taking readings early in June of soil penetration resistance both in the plant row and between the rows to provide a measure of soil compaction by machine traffic. Measurements will also be made of plant growth both above and below the soil surface. Counts of plant germination were made once this month.

Made one visit to Sakha on May 10 with Anwar to inspect the cotton experiment. Seeds were still germinating in some wet areas, and it appeared that a good stand of cotton would be obtained on all test plots. It was requested that we plant on the conventional Experiment Station alternate row spacings of 40 and 80 cm. They make no attempt to mechanically cultivate between the 40 cm. rows which means that a lot of hand labor is used. Hence, we made an agreement with the Experiment Station engineer for them to do all of the cultivation and spraying of insecticides on the test plots. The test plots will be treated identically with other cotton fields on the Station. The first cultivation was to be made on May 11 with a modified rolling cultivator. Two sets of slicer tines were operated in tandem in each 80 cm. row spacing with little or no cutting angle. Hence, they move very little soil and their biggest function was to help breakup soil clods. A small lister was placed behind the slicer tines to kill weeds and to make a furrow to aid irrigation. About 2 or 3 days later this same implement was used the second time primarily to make the furrows deeper for irrigation.

Detailed plans were made to install mechanization tests with maize on the Gianaclis Training Center Property. Two areas, 20 feddans and 13 feddans were to be planted. Primary tillage tests were to be installed on the 20 feddans; three methods of planting were to be tested on the 13 feddans. Preliminary surveys showed that the slope on both areas was too great for mechanization without excessive soil erosion. A survey was made on both areas to determine the volume of soil that would have to be moved to obtain a desirable slope. Seventeen thousand m^3 of soil would have to be cut on the 20 feddan area and 6,000 m^3 would have to be cut on the 13 feddan area. An

attempt was started on April 30 to rent some tractors to do this work but the effort failed to materialize. Even though the two Ford tractors were in Alexandria customs by the middle of May they were not delivered to Research and Development by the end of May. Since there are no classified tractor operators employed at the Tractor Test Station Mr. Naggar agreed to obtain two for the Ford tractors. This will be necessary for proper preventive maintenance, care, and use of the machines.

Completed writing the proposed Contract Research project on row spacing, the Executive Committee discussed it, suggested changes were made, it was approved in general, and it was assigned to two different Universities, Manofia and Zagazig. Each University will conduct the complete experiment in order to obtain information on two different soils. Trowse's report on soil investigations was typed and mailed to him for corrections and minor changes.

Attended three meetings of the Research and Development Executive Committee. The order of Soil Test Equipment was delivered and checked. Met with representatives of two different companies to discuss Research and Development needs and specifications of instrumentation for use in machinery research. Spent one day in Cairo discussing the possibility of incorporating research projects now in the Soil Improvement Subproject with Research and Development. We agreed to visit these projects with Dr. Mashalli early in June.

Major Activities for June:

Continue with cultivation, spraying, and soil measurements for the peanut and cotton projects. Initiate machinery work in Gianaclis as soon as the Ford tractors are delivered. Visit the Soil Improvement research projects in Fayoum and Beni Suef. Finalize specifications and get bids on some instrumentation, especially for field tests.

A.2 RESEARCH AND DEVELOPMENT SUBPROJECT

A.2.1 Research Program

Activity Report
June, 1983

Submitted by: Carl A. Reaves
Samir M. Younis

Progress:

Continued cultivation and soil measurements with peanuts in West Nubaria. The second application of fertilizer was applied, and it was noticed that rats may become a problem. Measurements of soil moisture contents plus penetration resistance within the crop row and between rows where tractor wheels pass were obtained. Also measurements were made on height of the peanut plants and the length of their roots, plus a plant count was obtained. Residual alfalfa is still giving a problem within the plant row so weekly cultivations were initiated.

Plant height and root length measurements were made for the cotton experiment in Sakha. Also bulk density and moisture samples were taken within the plant rows and between the rows where tractor wheels run. Completed a rough draft on the write up for the installation of the tillage tests.

Completed the detailed plans for maize experiments in Gianacelis. Measurements of bulk density, moisture content, and penetration resistance were made prior to installing the tillage tests. Tillage tests similar to those in West Nubaria and Sakha were installed on approximately 20 feddans. Four primary tillage tools were used - moldboard plow, disk plow, Justis sweeps, and the CP-24 chisel. Each tool was operated at three different depths: 15, 22, and 30 cm. One exception was that maximum depth obtainable with the CP-24 chisel was 25 cm. The TW 10 and TW 30 Ford tractors were on hand at this time and they did an excellent job of handling the tillage implements in this soil. Considerable soil smoothing was done on another tilled area of approximately 20 feddans. Reaves travelled out of the country at this time and Samir Younis was also away on some foreign travel, but some of the Engineers of the Tractor Testing Station did a good job of completing the planned experiments. To prevent excessive equipment traffic on the tillage test plots final land smoothing was limited to one pass of a disk harrow perpendicular to the crop rows and one pass of a Balady smoother in the row direction. Maize was planted on 80 cm. rows with the pne-matic planter. Rate of seeding was that recommended for the locality, and due to the late date of seeding time was not taken to apply fertilizer with the planter.

An additional 20 feddans had been previously tilled with a moldboard plow approximately 15 cm. deep. Ten feddans were used to install tests on the effects of row width on maize yield. Rate of seeding by weight was held constant for all row widths of 60, 70, 80, 90, and 100 cm. Irrigations, quantity

and kind of fertilizer, cultivations, and all other factors will be held as constant as possible. Seven replications of each row width were planted on a randomized complete sub-block design (each sub-block consisted of one replication). The other 10 feddans were used to install seven replications of tests to determine the effects of planting maize on a ridge, and cultivating to a ridge, planting on the level and cultivating to a ridge, planting on the level and cultivating on the level. This area was planted on an 80 cm. row spacing.

Attended three Executive Committee meetings. Traveled to Cairo once plus Beni Suef and El Fayoum once to help consider the possibility cooperating on some existing subsoiling experiments. Spend one day consulting with a Mr. Cox from MIAE that is presently working on some mechanization research in the El Minia area.

Major Activity for July:

Continue cultivating, fertilizing, spraying, etc. of the peanuts and maize. Help plan some potato experiments and subsoiling experiments on Ministry land near the Tracter Test Station. Cooperate on developing future activities at the Gianaclis Training Center.

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

AGRICULTURAL MECHANIZATION PROJECT

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صندوق بريد ٢٥٦ - الدقي - حيزة ج ٢٠٠
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٧٠٤٣٦٤ - ٧٠٧٢٤٧

DATE June 8, 1983 التاريخ

To : Dr. Ahmed F. El Sahrigi
Project Director

From : Engr. Mohamed A. El Naggar
Executive Director/R&D Subproject

Dr. Carl A. Reaves
Admin./Technical Director

Subject : Soil Improvement Research Projects in Beni Suef,
Fayoum, and Minia.

We spent the day of May 22 in Cairo and had a discussion with Dr. Mashalli on his 1982 land reclamation projects. He promised to supply us with a copy of 1982 data but this has not materialized. We visited the projects in Beni Suef and Fayoum with Dr. Mashalli on June 2 to aid in forming an opinion on whether the Mechanization Project should finance continued work.

1. It is our opinion that the Mechanization Project should supply approximately L.E. 15,000 for the three locations during the year 1983.
2. Since another group financed these projects in 1982 and have had access to the data we see no justification for refunding the L.E. 18,000, unless there was a prior commitment.
3. If the Mechanization Project finances this work beyond 1983, data collected should be extended to include actual physical changes in the soil and crop rooting patterns. This information is needed to precisely determine "the why" if results are positive or negative. It is too late for 1983, but R&D will be interested in pursuing these additional measurements beginning with the next crop season.

I. Beni Suef:

This area had never been drained. The primary objective for this area is drainage. We made a preliminary examination of the 1982 data at the Coop office. Apparently the tests were effective because wheat yields were, in general, about double those yields on untreated areas. The experiment appeared to

be well installed. It consists of open drains at two different spacings plus an open ditch collector. Between these open drains are perpendicular mole drains at two different spacings and partially filled with gravel, sand, or nothing. The project drains all land on about 100 feddans which belongs to over 100 farmers. A lot of effort was required to get cooperation from this many farmers, but it should provide a good demonstration for farmers over a much larger area. Effective mechanization will require cooperation of this nature over most of the Delta land.

Activities of the project include design, installation, and maintenance of the drainage system; primary and secondary tillage; application of gypsum; levelling; volume measurements of applied irrigation and drainage; and adequate chemical measurements within the soil and water. Adequate measurements are not being made of changes in the soil physical properties, development of the plant root system, and the actual durability of the mole drains.

Each farmer plants, cultivates, and harvests his own land by hand. If the project is continued after 1983 as much mechanization operations as possible should be incorporated. This would provide valuable information on the ability of this soil to resist machine traffic as well as the adaptability or willingness of farmers to participate in a highly cooperative effort.

II. Fayoum:

This area had never been subsoiled. Drainage is not a problem in this area and the primary objective, according to Dr. Mashalli, is to alleviate a very dense soil layer that extends from 30 cm. to 90 cm. below the soil surface. This dense layer developed at the time of soil deposit and was not made by man. The approach being used to correct the dense soil is to shatter it with machines and add gypsum to enhance stable aggregation. Gypsum will be added to the surface 15-20 cm. of soil and it is proposed that irrigation water will distribute the gypsum downward another 20-30 cm. Movement of gypsum within soil once it has been applied is still controversial, but most all of the research literature indicates that it move very little. Dr. Mashalli has agreed to make adequate detailed measurements to verify the extent that irrigation water does redistribute the gypsum as well as the increase in stable soil aggregates.

Open channels are employed to remove excess water used in an effort to translocate the gypsum. Conventional subsoilers are used in a direction perpendicular to the open drainage ditches at two different depths (40 and 60 cm.) and two different distances between shanks (60 and 120 cm.). No materials were added to the subsoiler tracks to aid in keeping them open. We did not see the 1982 data on yields but were told that yields were increased on all treatments. Tests were not installed on one-half of the proposed area in 1982 and no gypsum was available.

Again this experiment involves many small farmers and the effort expended on developing cooperation warrants financing

it for another year. Each farmer is responsible for all operations on his land from planting through harvesting. The discussion given for Beni Suef on extending measurements and degree of mechanization during 1984 applies to Fayoum.

III. Mina:

It has come to our attention that the primary drainage system for the larger area is not adequate to manage drainage from this project. Therefore, we do not recommend that this project be continued.

(Original Signed)

cc: Dr. Zakaria El Haddad
Dr. Amin Mashalli

A.2 RESEARCH AND DEVELOPMENT SUBPROJECT

A.2.2 Machinery Development

Activity Report
May, 1983

Submitted by: Allison Blanshine - TDY

Testing Station Projects:

Operation of the Italian Gaspardo FB 928-808 mower with rod extensions on wad board on right side and large rake wheel mounted on left side. In minimal grass there was little effect from the rake wheel or wad board extensions. In 90 cm. barbed wheat the wad board extension built up wheat and plugged the mower. The large rake wheel functioned very good in this material and moved it over making a neat windrow with heads top side. The mower main body is low slung and would drag the windrow on the successive pass making it impossible to operate. This would not be a successful operation without making major design changes to mower.

Operation of the Camon F-10 binder header worked extremely good in the bearded wheat making neat bundles heads top side with no twine.

Operation of the Dr. Saad Fathallah F-10 sickle bar unit with retarding finger reel would not function in the bearded wheat. The irregularities of the converging side sheets would cause the cut grain going with bearded heads rearward to catch on side sheets and plug the unit first one side and then the other side. The retracting finger reel really did not function either in the standing or downward crop because of inadequate adjustments. Removal of the reel support parts made only slight improvement in feeding. Later changes to even up the side sheets resulted in no improvement and the addition of straight sides sheets only very slight improvement. This unit needs active converging elements like rake wheels or augers to move this bearded wheat and form a windrow.

The Belin International B-2000 combine would not feed wheat up the inclined rubber apron feed table. A two strand rubber slat upper feeder and feed roll was designed and installed to aid this feeding problem. This unit has not been tested to date.

A.3 EXTENSION/TRAINING SUBPROJECT

Activity Report
April, 1983

Submitted by:	Fred Schantz	Salah Bakar
	Roger Engstrom	Salah Ismail
	Gordon Stringer	Fouad Metri
	Maher Iskander	Ahmed El Beheri
	Moh. Ismail	Moh. Abdel Aziz
	Dr. Mamdouh El Baz	Soiden
	Youssef Abdel Mawgood	Hassan
	Ibrahim El Gatas	Moh. Yasser
	Samir Showky	Moustafa Moh.
	Hussein Heiza	Essam Wasif

Summary:

Major events are summarized below. Detailed reports of each unit are found in A.3.1 through A.3.7. A.3.7 lists the expenditures for the month.

Extension Activities:

1. Most project village extension activities remained postponed during the month due to the continued absence of operating funds and severe fuel limitations.
2. The 11 Dentz/Fahr combine harvesters for wheat harvesting in project villages were delayed until next month although plans were completed for demonstrating these machines in project areas.
3. A Working Paper (No. 8) was completed during the month for the project entitled "Mechanization Extension in Egyptian Agriculture".
4. The first project directed limited cotton planting demonstration was carried out in Dakahlia governorate with Russian and Italian planters. Also demonstrated was the first Egyptian-made planter and an onion planter.
5. A major land leveling field day was carried out in Minia governorate with the Soil Improvement Subproject and EWUP (Egyptian Water Use Project) staff.
6. The revised equipment evaluation for group 2 and 3 demonstration/training equipment was completed and given to the project coordinator on the 28th. This procurement has been delayed since January due to absence of commodities funds.

In-Country Training Activities

1. During the month 24 trainees attended 4 new and continuing courses/sessions (A.3.5-A).
2. Absence of funds and fuel limitations continued to freeze training activities in training centers as well as field activities.
3. The 1983 Training Plan was approved by project Management and sent to USAID for final clearance.
4. Plans and programs scheduled to begin during the month continued to be developed and will be implemented as funds become available.

Participant Training Activities

1. Two more academic program candidates were put in processing with USAID/Cairo for a total of 7 candidates to date. As of April, 1983 a total of 210 candidates were screened through USAID for these participants.
2. Six more non-academic (technical) training programs were put in USAID/Cairo processing for a total of 8 programs for 56 participants to date.
3. A full-time participant training processing assistant is critically required to help process the voluminous paperwork required by USAID for these programs.

During the Month:

Few extension and training activities were carried out during the month due to continued absence of operating funds and severe fuel limitations for field travel. Except for a few demonstrations primarily outside of Project areas the subproject's planned programs were virtually stopped. This condition has had a continual devastating effect on the overall field implementation plans as farmers and extension personnel continue to complain about broken promises and in some cases economic losses due to our failure to produce as we planned. Several thousand Egyptian pounds of outstanding bills remain unpaid which has created a critical atmosphere in this subproject.

Ironically, the only noticeable achievement during the month was done by the participant training officer who managed to put 7 academic and 8 observation tours into process with USAID/Cairo. This marks an impressive step in the heretofore delayed participant training program.

The 4 field trips and 22 meetings during the month included:

1. Regular weekly meetings were continued during the month which allowed all subproject staff to discuss plans and arrange equipment movement. The meetings are somewhat caotic due to the small office for a large number of people including 2 secretaries.

2. Several machinery introduction fund committee meetings were held during the month to set policy and approve outstanding loan applications. Several of the sub-project's technical staff have been chosen as members of the committee to ensure project tested and recommended equipment is placed in Project governorates as required.
3. Training trips and meetings included a meeting at the Gianaclis Mechanization Research Center with agricultural companies to complete USAID forms for an observations study tour to be taken by this group in the U.S.A. Also trips to the Barrage Training Center in Cairo and to the Sakla Training Center in Kafr El Shieh to review training plans and facilities were carried out.
4. Several meetings were held during the month with the Dentz/Fahr combine harvester representatives to discuss/plan delivery and distribution of 11 units now due in May.
5. A meeting was held with the ICON company to discuss the status of the 4 John Deere flexi-planters distribution to project villages. For more than 2 months these machines have remained in Cairo due only to disagreement over: who will pay for the transport of these machines, who will be responsible for transport, if the machines are to be assembled in Cairo or in the field and the clearance procedures of the equipment. This exhausting process has delayed the equipment delivery which we hope will be resolved next month while we still need the planters.

Major Problems:

1. Same as January, 1983.
2. The lack of available funds, sufficient fuel and enough demonstration/training equipment to carry out spring activities.

Plans for next month:

1. Continue extension/training activities as possible with funds and severe fuel limitations.
2. Secure USAID final approval for the 1983 Training Plan.
3. Develop a plan draft with the German technicians at the Maamoura Farm Machinery Training Center for the Gianaclis Training Center.

4. Complete the distribution of 11 Dentz/Fahr combine harvesters to selected wheat fields.
5. Assist the local manufacturing advisor and staff locate two Berky threshers at the Shiek Ahmed village for testing during wheat harvest.
6. Secure group 2 and 3 demonstration equipment approvals and begin equipment orders.
7. Complete the quarterly cash need statement for the May/June/July 83 quarter.

Agricultural Mechanization Project

PLANNED FIELD ACTIVITIES SCHEDULE*

For 24 April - 12 May 1983

<u>DATE/DAY</u>	<u>TIME</u>	<u>ACTIVITY</u>	<u>LOCATION</u>	<u>SUPERVISOR</u>	<u>COMMENTS</u>
24 April, Sunday	0930	Extension/Training Staff Meeting	Cairo Office	Staff	Suk El Had
25 Monday	HOLIDAY	-----			
26 Tuesday	0500	Land Leveling Field Day	Minia	Soil Improvement Extension	Joint Effort
--OVERNIGHT--					
27 Wednesday	(return to Cairo from Minia)				
28 Tuesday	0800	Peanut Planting Demonstrations	Sharkia	Ahmed Beheri/ Roger Engstrom	

2 May, Monday	0700	Land Leveling, Preparation for Corn Planting in May-June	Delta	Ahmed Beheri/ Roger Engstrom	
3 Tuesday	0700	Training Centers Visit	Gianaclis, Maamoura, et al	Ibrahim El Gatas/ Hussein/ Fred Schantz	
--OVERNIGHT--					
4 Wednesday	(return to Cairo via Shiek Ahmed pretest village)				
5 Thursday	0700	Training Station Visit	Gebel Asfar	Maher Ismail/ Gordon Stringer	
10 Tuesday	0700	Evaluation of Extension/Training Activities	Project Villages	Peter Reiss	
11 Wednesday	0700	Wheat Combine Operations	Project Villages	Salah Bakar/ Fred Schantz	
12 Thursday	0700	Berky Thresher Operation	Shiek Ahmed Village	Richard Berky	

* Prepared for Mr. Jeff Lee and Mr. Arnold Radi of USAID to examine field extension and training activities.

A.3 EXTENSION/TRAINING SUBPROJECT

Activity Report
May, 1983

Submitted by:	Fred Schantz	Salah Ismail
	Roger Engstrom	Fouad Metri
	Gordon Stringer	Ahmed El Beheri
	Dr. Mamdouh El Baz	Moh. A. Aziz
	Youseef A. Maugod	A. Hamid Soiden
	Ibrahim El Gatas	Hassan
	Samir Showky	Moh. Yausser
	Hussein Heiza	Moustafa Moh.
	Salah Bakar	Essam Wasif

Summary:

Major events are summarized below. Detailed reports of each unit are found in A.3.1 through A.3.6.

Extension Activities:

1. As with the past two months many Project village extension activities remained postponed during the month due to continued absence of operating funds, fuel limitations, and availability of transportation required to carry out extension activities. (See attached letter).
2. Eleven Dentz/Fahr 980 combine harvesters were received at the pre-test village of Shiek Ahmed and were assembled, serviced and prepared for field site delivery. One unit was delivered to the project village of Ezab Besentwai where the first project field day was held on 31 May for combine harvesting of wheat. Of the remaining 10 units one went to the World Bank Research Station at Furoneia in Minofeya, one to the South Tahrir Farm, one to Dakalia governorate and two to Gharbya governorate (Kafr Dina and Shapshir El Hesşa villages). Four remained at Shiek Ahmed village awaiting transport to Minia governorate (1 unit) and Kafr Shiek governorate (3 units) (See A.3.5).
3. Progress was made on the finalization of group 2 and 3 demonstration/training equipment although approvals from two more committee meetings are still required. Also funds to purchase the equipment are still in progress.
4. Fifteen mower/binders were placed in project village for use in wheat harvest beginning this month. An Italian representative from Agostini spent two days in each area training and demonstrating to the extension staff and farmers. Mower binders which worked during the month at the farmers expense covered 200 feddans

in Beheira and Gharbya, 280 feddans in Sharkis and Qualibya and 250 feddans in Minia for a total of 730 feddans in 15 Project areas this month. (See attached letter and table).

5. The Project's extension senior technical staff spent a major part of the month outside of project areas attending the cotton trials in Dakalia governorate, peanut planting in Ismailia governorate, mower binder trials in Quesna, etc. The increased attention of the key extension staff outside of project areas has begun to seriously affect the programs beginning in the project villages which desperately require technical back-up while the equipment is arriving in the field.
6. Land levelling demonstrations were carried out on a limited scale with the primary activity in Minia (Abou Korkas district) where the Land Improvement Subproject equipment and staff coordinated with the extension staff to lazer level 15 feddans in addition to another 150 feddans in other areas.
7. The Extension Information Unit continued to produce needed posters (30) for field placement, assisted in organizing rice planting operations in Sharkia, prepared a T.V. program and coordinated activities with the extension department.
8. The Demonstration/Training Unit at Gebel Asfar continued rough land leveling with a bulldozer during the month. Lack of action on the proposed program (see GAF 83-25) has delayed these activities.
9. The Machinery Introduction Fund Committee met several times during the month and approved loans for L.E. 238,528 or 38% of the allocated amount to date; 7% or L.E. 44,560 has been disbursed (See attached tables).
10. The extension field staff cooperated with and assisted the planning staff and one staff member from the Research Support subproject to gather samples of wheat from fields planted with seed drills and by hand (See attached letter).

In-Country Training Activities:

1. During the month 388 trainees attended 29 new and continuing courses/sessions (A.3.5.)
2. Absence of funds and fuel limitations continued to paralyze training activities.
3. Final approval for the 1983 Training Plan was received from USAID during the month and 75 copies were printed and distributed.

4. Three days were spent with the Maamoura Training Center staff developing a draft of a training proposal for the Gianaclis Training Center at the Agricultural Mechanization Research Center at Nubaria Station. This plan will be finalized as time allows.
5. The quarterly cash need statement for in-country training for the May/June/July 83 quarterly was completed and given to the financial unit.

Participant Training Activities

1. Processing continues on 6 academic training programs now in the hands of USAID/Cairo.
2. Short term technical observation/study tour processing for 15 groups totaling participants also is in the hands of USAID/Cairo.
3. A full-time participant training assistant has been appointed to help the participant training officer process the large volume of paperwork required.

During the Month:

Most of the month was spent on assisting the Dentz/Fahr representative locate our 11 combine harvesters at the Shiek Ahmed village for assembly and predelivery service. A great deal of time was also spent trying to coordinate transport of the machines to work locations in project and outside of project areas as determined by project management. Several units were finally moved at the months end although by that time several areas had already been harvested or several damaged by rats. In almost all cases farmers were not pleased with the performance of the combines only because balers to press the straw were not made available by the project. This was a severe blow to the otherwise undoubtedly successful showing of these large, expensive machines which spent most of the month idle. There were a few exceptions where large farmers and farming companies utilized the machines primarily to clear their fields without great concern for the straw or provided their own balers. (See attached letter).

The mower/binders were an astounding success in all areas. Although funds were not available to run the equipment, farmers paid all expenses just to use the machine to cut and bind their straw. The first case of labor reaction was reported from the Qualibya governorate where several workers sabotaged one mower/binder in order to keep their jobs hand harvesting the wheat. This case, and others if present, warrant further study to determine if future increased use of more demonstration/training equipment might cause more severe reactions in the field and if so, how to deal with them.

A critical point made above (No. 5 - Extension) concerning extension senior technical staff spending a high percentage of their time outside of project areas, requires immediate atten-

tion. As revealed in the project evaluation report by Dr. P. Reiss and N. Habashi on Silage Mowers (Machines Demonstration Evaluation Series No. 1) dated 30 May 1983, project extension staff have not been able to provide useful information to farmers (P. 21) in addition to not being sensitive enough to farmers needs (P. 20) and not being able to fulfill promises (P. 21). The mechanization extension staff is gradually failing to successfully support the projects goals due to the lack of back-up (as well as delayed funds) which must be resolved before all confidence of the projects staff is lost. If project management plans to continue to expand activities throughout Egypt instead of 23 villages for which we have planned, additional senior technical staff must be added to cover additional areas to prevent a further deterioration of the present effort. During the month 6 field trips were taken and 23 meetings were held as summarized below.

1. Several periodic meetings were held on the Machinery Introduction Fund as well as weekly planning meetings.
2. Three meetings were held during three field trips with the German team at Maamoura training center to draft a plan for the Gianaclis Training Center.
3. Several meetings were held to try to finalize the revised list of Group 2 and 3 demonstration/training equipment which has been delayed since January, 1983 due to funds delays.
4. Several field trips were taken to follow-up and inspect the combine harvesters delivered to the project.
5. Traveled to training centers and extension sites with Mr. Jeff Lee, the Project Officer backstopping the project for USAID.
6. Met with the Soil Improvement Subproject staff to arrange field visits and generally coordinate common activities.
7. Attended the first combine harvester (wheat) field day at Ezab Besentwai on 31 May.

Problems:

1. Still pending from January 1983, primarily an almost impossible office to work in due to the secretaries and large staff in a small room, and
2. The lack of vehicles for two of the three project areas (Sharkia/Qualibya and Minia).

Plans for Next Month:

1. Continue extension and training activities as possible within the limited fuel allowances, absence of funds, and transportation limitations.

2. Continue to develop the Gianaclis Training Center Plan.
3. Attempt to secure approval for the long delayed group 2, 3 demonstration and training equipment.
4. Attempt to secure possession of 4 planters for maize planting operations.
5. Continue to press for approval for hay balers (Group 5) required for combine harvester operations.
6. Develop an IFB for foreign purchase of group 6 demonstration/training equipment.
7. Assist in the development of requirements for the sector approach for the Ministry of Agriculture's 5-year plan.
8. Assist in finalizing the quarterly cash need statement for February/March/April 1983.

بسم الله الرحمن الرحيم

AGRICULTURAL MECHANIZATION PROJECT

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مشروع المكننة الزراعية
وزارة الزراعة المصرية - وكالة التنمية الأمريكية
لدور الخامس - مبنى الجمعية العامة للإصلاح الزراعي

صندوق بريد ٢٥٦ - الدقي - جيزة ج ٢٠

٧٠٤٦٦٠ - ٧٠٤٧٢٠

٧٠٤٣٦٤ - ٧٠٧٢٤٧



27 April 1983

DATE _____ التاريخ

To : Dr. David Gaiser - Team Leader
Dr. Zakaria El Haddad - Project Coordinator

From : Fred Schantz, Extension and Training Coordinator

Subject : Fuel Limitations Effects on Extension Activities

The fuel limitation of 200 liters per month per vehicle has placed an unmanageable restriction on the extension activities since it began in March, 1983. This is primarily due to the use of Chevrolet Blazers and Suburban vehicles which get 3 to 6 kilometers per liter of fuel. With 200 liters they are able to travel 600-1200 kilometers each month which is one to two trips to the field per week. In order to try to adjust to this limitation we have located the coordinator's vehicles in the governorates to eliminate the fuel use going to and from Cairo. Since there is only one field vehicle assigned to our three area coordinators for all field extension activities, it is parked in the Beheira governorate. Also the two advisor vehicles and the field extension coordinator's (Ahmed Beheri) vehicle are now pooled for various field activities.

It may help to reiterate that the reason for procuring such large vehicles was to allow the project extension staff to carry the numerous M.O.A. governorate staff into the field when demonstration/training sessions are being held. Their lack of transportation has not allowed them to be in the field to the extent that our evaluation unit reported that few farmers were aware an extension man was assigned to their areas.

Considering the above information and the serious negative effects fuel limitations have on extension work which must be free to operate as the field needs demand, we request that our monthly fuel allowances be increased in order for the field effort to be successful. As we realize the necessity of the general M.O.A. rule of 200 liters to remain, we therefore request the attached fuel request forms which will be submitted on a weekly basis (according to need) be approved as they are submitted by our staff. Without additional fuel, especially during peak planting and harvesting seasons, critical feedback will be received from the target populations who are now depending upon our presence and technical assistance as new equipment is introduced in various areas.

(Original Signed).

Agricultural Mechanization Project

Demonstration/Training Equipment
Distributed to the Field During the Month of
May 1983

MACHINE	AREA			Date Delivered
	Units	Village	Governorate	
Combine Harvester (11 units)	3	Sheih Ahmed	Beheira	
	1	El Besentwai		
	1	K. Dima		
	1	Shop El Hessa		
	1	South Tahrir		
	1		Dakalia	
	1	Gima Meza		
	1	Sakha	Kafr El Shieh	
	1	Furoneia	Minofeya	
Mower/ Binder (15)	1	Ezab Besentwai	Beheira	
	2	Sheih Ahmed		
	1	Dessores		
	1	K. Danshit	Gharbya	
	1	El Hessa		
	1	K. Abriar		
	1	K. Hosofa		
	1	Soodire	Sharkia	
	1	Tahrir		
	1	Gosas		
	1	Shamout	Qalubya	
	1	Beltan		
	Berky Thresher (4)	1	Beni Abait	
1		Abou Korkas		

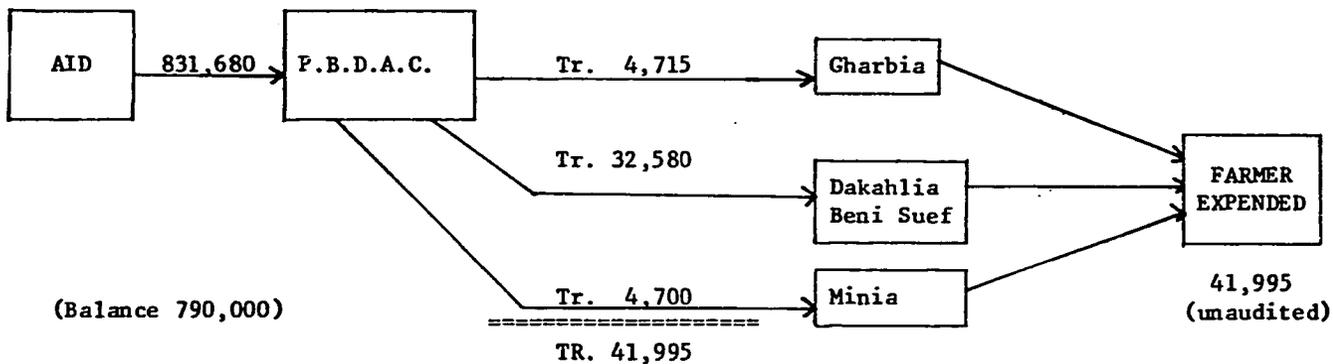
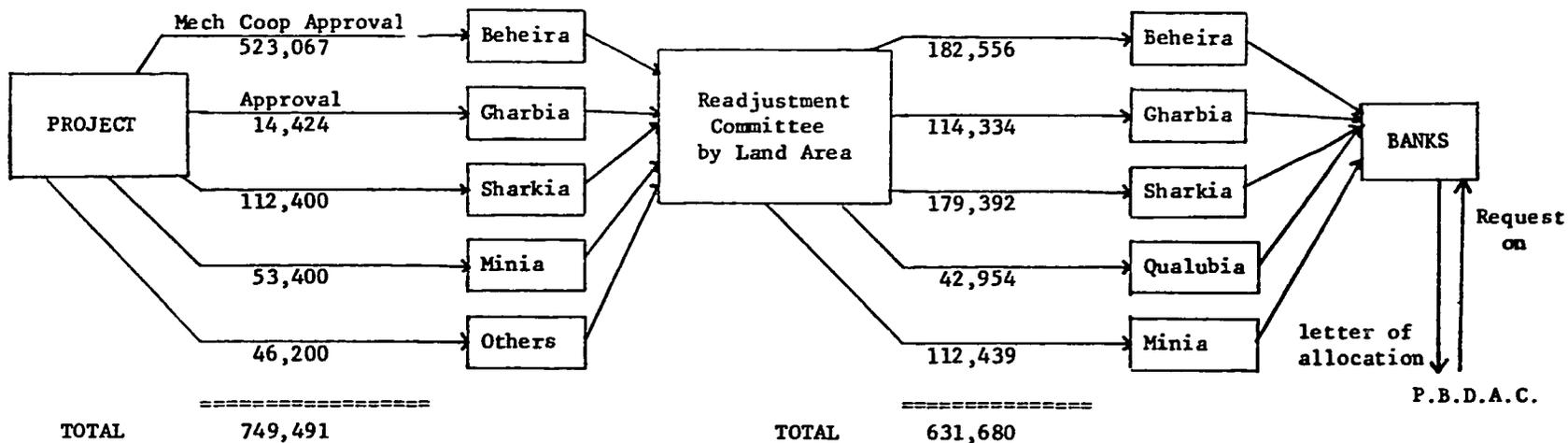
AGRICULTURAL MECHANIZATION PROJECT
MACHINERY INTRODUCTION CREDIT FUND STATUS
AS OF 5 June 1963

AREA	AMOUNT ALLOWED	% OF TOTAL	AMOUNT APPROVED		AMOUNT APPROVED AND IN PROCESS WITH L.E. BANK	AMOUNT SPENT L.E.	% of TOTAL	COMMENTS
			BEFORE THE COMMITTEE L.E.	BY COMMITTEE L.E.				
AREA	182,556	28.9	523,67	35,200	-	-		
AREA	114,334	18.1	14,424	135,726	4,715	4,715		
AREA	42,954	6.8	-	15,000	-	-		
AREA	179,397	28.4	105,200	51,700	-	-		
	112,439	17.8	51,800	900	4,700	4,700		
	-	-	44,800	-	35,145	35,145		
	631,680	100	739,291	238,528	44,560	44,560	7%	

TYPE/NUMBER OF EQUIPMENT PURCHASED/ORDERED/APPROVED

MOULD BOARD	CHISEL FLOW	DISC HARROW (M/T)	ROTO-DRILL - M/SP	FLY WHEEL	LAND SCRAPER	RIDGER	SEED PLANTER	GRAIN DRILL	SILAGE MOWER	MOWER/BINDER	THRESHER	AG BAC-KHOE	Loader	Distributer F.	Baler	Sprayer	Res.	Comments
		13	5		21		20	1	35	44	43	28						
	2	3	5		9	2	5		10	10	6	7						
				1														
		14						6	20			14						
3			4		2		1		3	1	3	1	1	1	1	4		
			3						2	1		5						
3	2	30	17	1	32	2	26	7	70	56	52	55	1	1	1	4		360 Total

MACHINERY INTRODUCTION FUND STATUS AS OF
MARCH 30, 1983



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

AGRICULTURAL MECHANIZATION PROJECT

A. I. D. Proj. NO. 263-0031

EGYPTIAN MOA/USAID

5 th. Floor - Building of the
General Society For Land Reform

P. O. B. 256 Dokki - Giza, ARE.

704660 - 704720

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مشروع المكنة الزراعية
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٧٠٤٦٦٠ - ٧٠٤٧٢٠
٧٠٤٣٦٤ - ٧٠٧٢٤٧

DATE May 10, 1983 التاريخ

To : Fred Schantz
From : Steven Shepley
Subject : Procedures and Schedule for Wheat Yield Sampling

The following is a list of procedures and schedule for the wheat grain drill yield sampling.

Procedures:

1. As many fields as possible shall be sampled.
2. There shall be a minimum of 4 samples from each field.
3. Samples shall be randomly drawn in the fields one meter back from the length and width boundaries.
4. Farmers shall be paid an average L.E. 5.00 for each field samples to compensate for entry and exit losses.

Schedule:

<u>Date</u>	<u>Location</u>	<u>Start Time</u>
May 16	Sharkia	8:00
May 17	Sharkia	8:00
May 18	Sharkia	8:00
May 19	Qalubia	8:00
May 21	Gharbia	8:00
May 22	Gharbia	8:00
May 23	Behera	8:00
May 24	Behera	8:00
May 25	Behera	8:00
May 26	Behera	8:00

Support Requirements:

1. Participation of regional coordinators to facilitate farmer cooperation and field identification.
2. Rental of a portable hand thresher and cutting equipment.

(Original Signed)

بسم الله الرحمن الرحيم

AGRICULTURAL MECHANIZATION PROJECT

A. I. D. Proj. NO. 263 - 0031

EGYPTIAN MOA/USAID

5 th. Floor - Building of the
General Society For Land Reform
P. O. B. 256 Dokki - Giza, A.R.E.

704660 - 704720

704364 - 707247



مشروع المكنة الزراعية
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٧٠٤٣٦٤ - ٧٠٧٢٤٧ ☎

DATE 10 / 5 / 1983 التاريخ

To : Dr. David Gaiser - Team Leader
Dr. Zakaria El Haddad - Project Coordinator

From : Fred Schantz - Roger Engstrom - Ahmed Beheri
Extension Unit Staff

Subject : Wheat Harvesting Plan for May/June 1983

Attached is the wheat harvesting plan for May/June 1983 as worked out by the Extension/Training staff. It includes the following:

1. Combine distribution will be as follows:
 - a) 5 units in Behera/Garbya area under the direction of Eng. Mohamed Abdel Aziz.
 - b) 2 units in Sharkia/Qalubia area under the direction of Eng. Soiden.
 - c) 1 unit in Minia area under the direction of Eng. Hassan.
 - d) 3 units under the direct supervision of Salah Bakar as follows.
 - (1) 1 unit: Minoufeya research station
 - (2) 2 units: EMCIP state farm areas of the ARC (Sakha and Gima Meza) for temporary use/training before moving to project areas.
2. Overall supervision for the field operations will be completed by Mr. Harold, the German Dentz/Fahr combine representative. Additional technical advice/training support will be provided by the Project's technical staff as well as the qualified personnel of the Maamoura Farm Machinery Training Center who have agreed to assist during wheat harvesting.

3. All eleven units are being moved to the Shieh Ahmed pretest village for predelivery service on 11-18 May by Mr. Harold who will complete the non-field operations training for the 27 operators/Mechanics/Engineers from selected project areas on 18-25 May. Then the machines will be transported to their assigned areas.
4. Evaluation of the yields will be carried out by Adel El Wadi of the Research and Development Subproject and Steve Shepley and Zaki Helmi of the Planning Unit during harvest in conjunction with the area extension coordinators.
5. A critical need still exists for the following in order to carry out the plan:
 - (a) 2 Suburbans - one for the Sharkia/Qalubya and one for the Minia area extension coordinator.
 - (b) 30 Motorcycles - for the project's field specialists.
 - (c) 30 sets of hand tools - for the field specialists. We strongly urge the pending numerous requests for these items to be approved as soon as possible. It will be difficult if not impossible to carry out the attached plan without them. It is impossible to effect field operations without transportation and support systems.

(Original Signed)

WHEAT HARVESTING SCHEDULE 1983*

<u>AREA</u>	<u>VILLAGE</u>	<u>MACHINE UNITS</u>	<u>NO. OF FEDDANS</u>	<u>HARVESTING DATE</u>	<u>FARMER(S)</u>	<u>SPECIALIST</u>	<u>COMMENTS</u>
Behera	Shiek Ahmed	2	400	31 May	(Many)	M. El Sadney	
	Ezab Besentwai	1	130	3 June	(Many)	Mahmoud El Kmary	
	(other areas)		140	31 May	(Many)	M. Abdel Aziz	(to be determined)
Garbya	K. Damshit	1					(prefer mower/ binder)
	Kafr Dima	1	45 (maybe more)	31 May 31 May	Abdel El Monim Abou Gazia	Helmy Abou Zeid	Large farmers
Sharkia	Saadin	1	70				
	Teline		65				
	El Gosak	1	95	31 May			
Qualubya	Beltan		6				
Minia	Beni Musa	1	6		Sedky M. Abou El Maged Ahmed Abu Zeed Ahmed	Moustafa	
	Beni Suef (seds) (RC Center)			29 May			
EMCIP Areas	Saka	1	200				
(Stations- State Farms ARC)	Gima Meza	1	200				
<u>OTHER AREAS/LOCATIONS</u>							
Minofeya		$\frac{1}{11}$	<u>1357</u>				

* NOTE: All involved emphasized the need for balers/choppers before beginning

A.3 EXTENSION/TRAINING SUBPROJECT

Activity Report
June, 1983

Submitted by:	Fred Schantz	Hussein Heiza
	Roger Engstrom	Salah Bakar
	Gordon Stringer	Salah Ismail
	Maher Iskander	Ahmed El Beheri
	Dr. Mamdouh El Baz	Moh. A. Aziz
	Yousseef A. Maugod	A. Hamid Soiden
	Fouad Metri	Hassan
	Ibrahim El Gatas	Moh. Yasser
	Zaghloul Sayed El Sayad	Moustafa Moh
	Samir Showky	Essam Wasif

Summary:

Major events are summarized below; detailed reports of each unit are found in A.3.1 - A.3.7. A.3.7 lists the expenditures for the month.

Extension Activities:

1. Extension and training activities began to pick up this month with the arrival of the February/March/April 83 quarterly cash needs monies. The long delay in processing these funds dealt a devastating blow to the spring planting (cotton, maize, peanuts, soybeans) and harvesting (wheat, berseem) operations which had to be carried out under severe budget limitations.
2. Fuel limitations which have been severely limiting field travel were somewhat relaxed allowing most of the planned activities to be carried out. The problem of month-end needs when the fuel has been used up but travel is still required remains unresolved.
3. Approvals were secured to purchase Group 2 and 3 demonstration/training equipment which has been pending since January 1983.
4. Four John Deere 71 unit seed planters were finally delivered to the field (Shiek Ahmed village) after months of funds and bureaucratic delays. Unfortunately they were not assembled in time and the required seed plates for maize were not delivered by the supplier ICON. The result was a failure to plant maize, soybeans or peanuts in project areas this year.
5. Numerous wheat harvesting demonstrations were carried out with combine harvesters and mower/binders during the month. The long awaited report from the field specialists has been requested several times but is still being prepared. Hopefully, this will be ready for the July 83 monthly report.

6. Eleven hay balers (Group 5 demonstration/training equipment) were ordered during the month to work in the fall rice harvest with the combine harvesters. These were ordered after several farmers refused to allow the project to harvest their wheat unless the valuable straw could be baled. Some larger areas like South Tahrir farm, Major Cereals (EMCIP) areas and some larger farmers allowed the large combines in their fields where the straw was not dealt with.
7. A four million IFB (Invitation for Bids) tender was drafted to procure more needed demonstration/training equipment in foreign currency.
8. A comprehensive sector development plan and budget was prepared with the financial unit and presented to the MOA and USAID. It included a multi-million dollar budget for sectoral development of Egyptian agriculture over a 5 year period.
9. A major field day was held at the pretest village of Shiek Ahmed for the Minister of Agriculture, Dr. Y. Wali and project staff. Demonstrated were project recommended equipment and locally manufactured agricultural machinery (June 11).
10. The Extension Information Unit continued work on 30 posters, mechanical rice transplanting programs and an extension pamphlet on land levelling.
11. The Demonstration/Training Unit at Gebel Asfar continued land preparation activities with continued financial, bureaucratic and administrative limitations (A.3.4-A). A quarterly cash need statement for their specific needs was submitted on the 29th of June which will be partially covered by the subproject funds (i.e. approved line items). It is apparent that unless this unit receives immediate support from the MOA the fall/winter crops will not be planted.
12. The Machinery Introduction Fund Committee met during the month to approve most of the available funds. A full up-to-date report will be available as soon as the banks' spending status is recorded.

In-Country Training Activities

1. During the month 1,609 trainees attended 158 new and continuing courses/sessions. (A.3.5-A)
2. The development plan for the training unit at the Gianaclis Station was temporarily postponed due to other priorities.
3. The quarterly cash need statement funds for February/March/April 83 finally were received after several months delay. This resulted in a reactivation of the training plan which has been postponed for 3 months due to the lack of funds.

Participant Training Activities

1. All 6 academic and 11 of the 16 observation/study tours are now in the hands of USAID/Washington for final processing. The remaining five observation/study tours are still with USAID/Cairo who is trying to finalize placements in non-USA countries.
2. Intensive efforts continue to press for the finalization and notification of approval for all programs. To date one academic and one observation/study tour group have been completely cleared. It appears that due to administrative and bureaucratic conditions most programs will be delayed somewhat from original plans.

During the Month:

Hope was restored in being able to carry out the planned activities for the extension and training subproject staff this month with the overdue arrival of funds, approvals for the critically needed group 2 and 3 project villages demonstration/training equipment, a loosening of the tight fuel restrictions (now 500 liters maximum instead of 200 liters per month), and a good showing of wheat harvesting operations primarily with mower/binders and to some extent (in larger areas) with the combine harvesters. It is unfortunate that these delays occurred during the spring when the year's major activities occur but the fall season's operations - and next spring's - will prove more successful than before due to these recent achievements!

Note must be taken concerning the events at the demonstration/trainin unit's Gebel Asfar farm where considerable farming equipment and tooling is arriving the the land is far from being ready. Extensive land leveling and preparation is required for which funds need to be made available soon or the entire effort there will be lost this year.

During the month several notable meetings were held and field trips were taken as summarized below:

1. Several meetings were held by the Machinery Introduction Funds Committee to discuss requests for equipment and approve numerous loan applications.
2. A meeting was held at the ORDEV office in Mohandissen to discuss use of their loan funds for equipment. Forms were given to the staff and future discussions were planned.
3. A field trip was taken to the village of Saadin in Sharkia governorate to examine/train staff on a combine harvester working there. The same violent, negative response was given by the large farmer who wanted his straw baled if the combine was to stay in his field. Since balers were not procured by project management, the combine was removed from the field and remained idle most of the month.

4. A ministerial level meeting was held in Dr. Colee's office with USAID staff to discuss plans for carrying out the sectoral approach in agricultural development starting in 1985. The contractors were asked to prepare budget estimates for the various sectors.
5. A meeting was attended with Dr. Sahrigi/Steven Shepley (Dr. Gaiser was on leave)/Dr. Zakaria El Haddad and USAID officials concerning the recent AID evaluation of the project. A critique was made of the poor evaluation and follow-up was requested.
6. Extension and training staff coordinated with land improvement staff during several trips to Minia, Beni Suef and Fayoum to examine land levelling/extension/training activities in these areas.
7. Extensive meeting time was spent during the month by the extension/training coordinator preparing and finalizing the quarterly cash need statement for all the Project's subprojects which was prepared for authorized signatures of project management.
8. Several meetings were held with the USAID training staff to assist/press for finalization of the pending participant training programs.

Problems:

1. Pending from January, 1983 monthly report.
2. Lack of vehicles for two of the field coordinators who have been without vehicles almost all year.
3. Extreme difficulty getting typing completed in English due to the typists' workloads.

Plans for Next Month:

1. Continue extension and training activities as possible.
2. The extension/training coordinator will take his annual leave from 14 July 1983 until 23 August 1983.
3. Finalize the IFB for foreign currency procurement of additional demonstration/training equipment.
4. Arrange/conduct farmer and extension staff meetings to discuss fall/winter plans/operations.
5. Plan for July to December activities, mainly cotton stalk mowing, rice harvest land leveling, and wheat planting operations.
6. Continue development of the Gianaclis Training Plan.
7. Press for positive action and field deliveries in procuring group 2, 3 demonstration/training equipment.
8. Prepare the quarterly cash need statement for August/September/October 1983.
9. Bind the 23 village programs now prepared in Arabic and English for examination and revision for the upcoming year's operations.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.1 Extension Advisor

Activity Report
April, 1983

Submitted by: Roger Engstrom

Summary:

Cotton planting/Irrigation/Spraying Herbicide. Germination good - land was not level nor sloping 5 cm. as stated. Germination was very slow in areas where water was too much. Too much water also caused heavy crusting. We must be very careful with maize and especially soybeans. Tested three planters; also tested local planter, see report. Follow-up on land levelling/tillage/planting, located thresher to observe. Laser field day in Minia. Harvesting garlic/onions with French machine. Preparation for peanut planting had good cooperation getting planters in Dakahlia, rice preliminary plans/maize/soybean.

Problems:

1. Tillage/leveling/seedbed preparation.
2. Inadequate machine for peanuts.
3. Getting drivers to follow marker on planters.

Plans for Next Month:

1. Peanut planting.
2. Maize/soybean planting making hiller for planter.
3. Fertilizing spreader, rice nursery/rice seeding, transplanter combine/threshers.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.1 Extension Advisor

Activity Report
May, 1983

Submitted by: Roger Engstrom

Summary:

Continued following on cotton planting, irrigation, cultivation. Unfortunately we did not get a good cultivation due to tractors being unavailable during the Minister's visits, the proper cultivator is ready to operate on the inside of rows. (The outside is uneven because they did not follow the marker while planting). Rice preparation, direct seeding. Mower binders are working and work well with twine. Some problems with maintenance and trying to work early and late when undergrowth is wet. Weeds also give problem when wet. Combines slow to get assigned to proper fields land leveling and preparation.

Spike tooth harrow aided land preparation and saved a trip observed turkish thresher.

Problems:

1. Corn planters spike tooth harrow, to sites could not find edge drop planter.
2. Twine for mower binder.
3. Balers to follow combines.

Plans for Next Month:

Combine harvest, mower binder, rice planting corn planting too late for soybeans leveling.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.1 Extension Advisor

Activity Report
June, 1983

Submitted by: Roger Engstrom

Summary:

Minister visit to S.A. Much activity and accomplished tool stop/storage had construction. Looks good combine harvest-machine good, cut low threshed and cleaned well. Need baler to collect straw. Used a chapper baler at Quesna, it was very satisfactory in clopping and baling some problem with twine tying. (It was damaged in transport). Also need rake to get straw out of irrigation channel so baler can pick-up.

Planters delivered but not yet assembled for use. Furrow/ridger opening to mount on planter finally started; siphon to be demonstrated at Minia - land leveling.

Problems:

1. Fuel (twine for balers - had to make secondary channel)

Plans for next month:

1. Follow corn planters.
2. Adapt furrow/ridger for planter
3. Plans and equipment orders.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.2 Field Extension Officer

Activity Report
April, 1983

Submitted by: Ahmed El-Beheri

Summary:

1. Attending peanut committee
2. Planting 208 feddans in Dakhlai.
3. Three visits to our villages in Minia.
4. Demonstrating onion digger.
5. Demonstrating the planter which is made in Egypt.
6. We attended three field days with German group.
7. The second one in Minia the third one in Behera, attended a meeting in Sharkia to discuss the plan for rice drilling.

Problems:

1. There is no transportation for two coordinators.
2. Shortage of equipment.

Plans for Next Month:

1. Demonstrate the new equipment for harvesting.
2. Arrange a meeting with the farmers.
3. Peanut planting.
4. Rice planting.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.2 Field Extension Officer

Activity Report
May, 1983

Submitted by: Ahmed Beheri

Summary:

1. We planted 3 feddans by peanut planter at Salam Village in Sharkia governorate. Demonstrated the machine in Ismailia governorate.
2. We attended a peanut committee three times.
3. We carried out field days with a group of trainees from A.I.C. to show them the project activities at El-Sheik Ahmed Village.
4. We attended several meetings with Agricultural department staff in Sharkia for rice drilling.
5. According the Project activities we accompanied experts belonging to mower binder company through Tanta Motors Co. for adjusting and servicing 15 units which is delivered to the project before the harvesting season.
6. We went to ICON warehouse for checking 4 John Deere planters.
7. We cultivated 29 feddans which is planted by cotton under supervision of extension and training subproject in Dakahlia.
8. We managed the combine/distribution to the wheat fields.
9. We built the machinery ramp at El Shiek Ahmed for loading and unloading machinery.
10. Preparing maize land for planting by planter.

Problems:

1. There is no transportation for two coordinators.
2. Shortage of equipment.
3. Shortage of financing effects our summer program.

Plans for Next Month:

1. Services and maintenance the project machines.
2. Peanut cultivation.
3. Maize cultivation.
4. Rice planting

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.2-A Sharkia, Qalubia Extension Officer

Activity Report
May, 1983

Submitted by: Abd El Hamied Soidan

Summary:

1. We harvested 15% feddans wheat at Sharkia and 130 feddans wheat at Qalubia.
2. Training course for mower binder at Sharkia and Qalubia.
3. Field day for wheat harvesting at Magoul Qalubia.
4. We made plans for planting 1,000 feddans with rice drilling.
5. We started land levelling for rice land.
6. Follow-up for agricultural machinery loans.

Problems:

1. We have no car.
2. The farmers at Sharkia refused combine harvester without pick up baker.

Plans for Next Month:

1. Planting 1,000 feddans rice drilling at Sharkia.
2. Wheat harvesting.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.2-B Minia Extension Officer

Activity Report
May, 1983

Submitted by: Hassan Abdel Razek Abdel Mowla

Summary:

1. Harvesting about 250 feddans wheat in May and Abo Korkas in the Project village and near other village.
2. Making training on the mower binder, the project engineers in Minia.
3. Making training on the soil level for extension engineers.
4. Making levelling for about 100 feddans in the project village in Abo-Korkas.
5. Follow up for agricultural machinery.

Problems:

1. There is no car.
2. The combine does not work because it arrived late and there is no shaffer binder.

Plans for Next Month:

1. Complete harvesting work.
2. Make levelling in Matay, making a group extension for preparing to level about 150 feddans in every village. After summer crop.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.2-C Behera, Garbya Extension Officer

Activity Report
May, 1983

Submitted by: Moh. Abdel Aziz

Summary:

We received 11 combines at El Sheik Ahmed and we assembled with the company people. We received a man from Aogastine Company and we adjusted and help keep 8 mower binders machines working at the field, 4 at Behera, and 4 at Gharbia which harvested about 200 feddans. We got 4 combines at Behera and Gharbia. Am working at state farm at Behere to help harvest about 350 feddans. This combine which arrived on 27 May at Ezab Besentwai worked 3 feddans and we moved it to Monofia. Gharbia one arrived on 31 May at Shabsher El Hessa.

Problems:

1. Combine without balers were not allowed to stay in most fields.
2. Planters not arrived in time and missed maize season.

Plans for Next Month:

1. We shall move one combine to Saka Research Center and Gamza.
2. Will follow up harvesting at Kafer Dema.
3. Field day at El Sheik Ahmed 11th of June.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.2 Field Extension Officer

Activity Report
June, 1983

Submitted by: Ahmed El Beheri

Summary:

1. We finished building the ramp for loading and unloading machinery.
2. We assembled the tractor shed.
3. I accompanied the machines group for rice transplanting in Behera governorate.
4. Maize planting by Italian planter at Quesna.
5. Three visits to Sharkia for rice drilling.
6. We managed the pretest village for the Minister's visit on Saturday the 11th of June.
7. Moving combine harvester to Sharkia, Gemza, and Quesna for wheat harvesting.
8. We attended three meetings of machinery introduction fund.
9. Receiving 4 planters from ICON Company for maize and other crops.
10. Sending thresher from El Sheik Ahmed to Mansura.

Problems:

1. Shortage of transportation for Minia and Sharkia.
2. Receiving 4 John Deere planters at the end of the summer seasons.

Plans for Next Month:

1. Machinery distribution.
2. Maize cultivation
3. Machinery servicing.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.2-A Minia Area Extension Officer

Activity Report
June, 1983

Submitted by: Hassan

Summary:

1. Complete harvesting work.
2. Making meeting in Beni Mousa about soil improvement.
3. Preparing land collections in every village in about 150 feddans for leveling after summer crop.
4. Making levelling of Elbeek land in El Etlate.
5. Transporting combine harvesters to Minia and make experiment in Abo Korkas.

Problem:

1. No car.
2. The farmers want another machine; like cotton harvester.

Plans for Next Month:

Making extension about syton tubes to employ it in El Etlat, the land will be levelled.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.2-B Behera/Garbya Irrigation Extension Officer

Activity Report
June, 1983

Submitted by: Esam Wasif

Summary:

Following up siphon irrigation method in cotton in Gharbia and Behera governorate.

Problems:

1. Car brokedown during Ramadan month forced me not to follow up on corn cultivated in long furrow in the two governorates.
2. Difficulty of convincing farmers to adapt the long furrow irrigation method.
3. There is not enough siphon pipes.
4. The village's extension officers are uncooperative people with me that causes a real problem to my work.

Plans for Next Month:

It is planned to irrigate about 10 - 15 feddans cultivated with corn by long furrow in each village.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.2-C Qualibya and Sharkia Extension Officers

Activity Report
June, 1983

Submitted by: Yasser Adly

Summary:

Table

Long Forward Irrigation On Qualibya and Sharkia						
Governorate	District	Village	Crop			Observation
			Cotton	Corn	Soybean	
Sharkia	Minia El Kamh	El Saadiun	39 F.		---	There are 15 feedan corn in Long for- ward irriga- tion in Dyarb Neagm District.
		El Teline	5 F.	2.5 F.	---	
	-----	-----	-----	-----	-----	
	Belbase	Gosok	---	19 F.	---	
Qualibya	Toukh	Kafr El Housaph	---	---	---	
		El Hessa	---	---	---	
		Beltan	---	---	16 Kerat	
	-----	-----	-----	-----	-----	
	Banha	El Shamout	---	---	---	
		Magoul	---	---	---	
The Gross			44 F.	21.5 F.	16 Kerat	

Problems:

1. The engineers for Qualibya do not help and make work slow down.
2. The engineers were busy on the villages with wheat harvesting operation and rice farming for that we can't take more area than it.

Plans for Next Month:

1. Trying to expand the cornfield as I can.
2. Controlling and coordinating in Sharkia and Qualibya.
3. Making a report about cotton, corn and soybean farming.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.3 Extension Information Unit

Activity Report
April, 1983

Submitted by: Dr. A. Mamdouh El Baz

Summary:

1. Receiving formerly procured A.V. aids from the dealer, and delivering some of it to Maamoura Training Center (complete set of video, slide projector, overhead projector).
2. Spending a long time for office work past since last month (absence at Cairo International Fair).
3. Paying a visit to Noubaria Farm to look into needs of extension and training ends.
4. Preparing for an information convey across several governorates.
5. Contacting extension department for cooperation in seeding 2,000 feddans with rice in Sharkia Governorate.
6. Storage safe place.
7. Store-booking system.
8. Lack of liquid money makes it hard to take responsive actions towards several activities.
9. Specifications and bids for field extension signs requested by soil improvement unit.
10. Preparing a pocket calendar for the fasting month.
11. Following up rice seeding in Sharkia, in cooperation with extension department.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.3 Extension Information Unit

Activity Report
May, 1983

Submitted by: Dr. Ahmed Mamdouh El Baz

Summary:

1. Closer contact with extension department for using seed drills to plant about 1,000 feddans with rice in Sharkia.
2. Paying visits to Qaliubya and Garbia to withdraw some planters and disc harrows from here and there to provide Sharkia with extra number of machines to seed the farmer area.
3. In Kafr-El-Shiek for rice transplanting.
4. At Sheik Ahmed village in a field visit arranged by L.E.C.A. for missioners.
5. Attending a wheat harvesting field day at Besentwai Mahmoudia, Behera governorate.
6. Primary contact with Ministry workshop to manufacture 30 extension sign for soil improvement unit.
7. With National T.V. at Badrasheen and Mit Rahena to prepare a rural program about cheaper alternatives to cotton-cakes.

Plans for Next Month:

1. Supporting the nearly born cooperation with extension department, and following up activities introduced in Sharkia.
2. Lack of funds makes it difficult to project future activities.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.3 Extension Information Unit

Activity Report
June, 1983

Submitted by: Dr. Ahmed Mamdouh El Baz

Summary:

1. Following up, with extension department, seeding of rice by seed drills in Sharkia, in about 1,000 feddans.
2. Two visits to Shiek Ahmed village, in one of them the Minister of Agriculture and Governor of Behera, wheat harvesting - German.
3. In Kafr El Shiek governorate, where Dr. Yousef Wali, was there to have a look on rice mechanical transplanting.
4. To make 30 metallic (extension) signs, the Ministry's workshop will fabricate it, and other precious order to an advertising agency for drawing and hand writings.
5. Collecting material to issue an extension bulletin about land levelling.
6. Broadcasting and T.V. rural program about rice mechanical transplanting on June 6, 1983.

Problems:

As mentioned before.

Plans for Next Month:

1. Translating into English, revising and editing a booklet about project activities.
2. The same thing with preparing discussions at harvest machines - seminar.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.4 Gebel Asfar

Activity Report
April, 1983

Submitted by: G. B. Stringer

Summary:

Mr. Said Assar joined the Gebel Asfar Farms Unit as of the first of the month of April. Mr. Stringer returned from home leave at the beginning of the month.

Activities during the month were as follows:

1. Contact with E.G.C.T. and ICON regarding equipment delivery both from abroad and from the local market.
2. Having the bulldozer clear about 150 feddans of the Phase I area. These fields will be formed into about 8 large fields for the mechanized operations.
3. Revision and update of the plan of work which has been submitted to Dr. Sahrigi, Dr. Zakaria El Haddad, Dr. Shehata and Dr. Gaiser.
4. Update of the canal and basin system plan which has also been submitted.
5. Discussion of the drip irrigation plan for Gebel Asfar with the irrigation committee.
6. Contact with the Egyptian Dredging Company to try to arrange for rental of leveling units.
7. Beginning of the survey work for the Phase I land to determine the amount of dirt that will have to be moved.
8. Movement of the office to Gebel Asfar.

As of the end of April we are on schedule with the farm development activities. (For details of Gebel Asfar Farms operations refer to GAF 83-25).

Problems:

1. Inability to accomplish anything on a timely basis due to procedural red tape.
2. Inability to receive the equipment which was to be supplied from the local market.

Plans for Next Month:

Refer to GAF 83-25.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.4 Gebel Asfar

Activity Report
May, 1983

Submitted by: G.B. Stringer

Summary:

During May two fields have been surveyed. Five fields are left. They cannot be surveyed until the trees are removed and or ponds are dried and brush disced in. A TD 15 dozer was rented and started work on 22 May removing trees. It has completed one field. The work day is very short and the field efficiency is very low. The uprooted trees are still in the field so that surveying cannot go forward. On 23 May, Dr. Shahata visited the farm to see the areas in which we will be working. We have now been given about half of the shop area and the fenced equipment area has been redesigned.

Due to the lack of receipt of any funds and/or supplies very little of the programmed activity has taken place. Refer to GAF 83-25:

- No office supplies have been purchased.
- No shop fix-up started due to no tools or supplies
- In spite of many committee meetings no equipment has been received from the local market.
- Shop cleanup is not done.
- Tree removal is complete for one field, four fields remain to be done
- Shop fence is not installed.
- No work is done on shop set-up
- No work has been done on settling basins.
- No work has been done on canals.

The ZIM California sailed on 6 May and is expected to arrive in Alexandria around 8-10 May with the new John-Deere equipment.

Problems:

See above.

Plans for Next Month:

See GAF 83-25 we are following this program but at a slow pace. Once we receive shop tools and equipment as well as our field equipment we should be able to speed things up. At present we have no control over any activities which must take place in order that we can proceed.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.4 Gebel Asfar

Activity Report
June, 1983

Submitted by: G.B. Stringer

Summary:

Bulldozer operations in May and June totaled 128 hours. Operations were clearing bamboo and uprooting trees. Administrative problems and lack of spares have resulted in low operational hours.

The uprooted trees have still not been removed from the fields. This prevents the survey work from being carried out. Delay is due to administrative routine.

The data from the third field that was surveyed was delivered to Mr. Coles group on 26 May. We have to date not received the computer run on this field for cut and fill yardage. This field is vacant and could be leveled at this time.

The first equipment from the local market was received/delivered on 20 June. At this time about 1/3 of the local market delivery is still not complete even though the committee decision was made on 2 June and the letter delivered to EGCT on 9 June, 1983.

Three 40 foot containers arrived in Alexandria on 11 June aboard the ZIM California. To date they have not cleared customs and we have no estimate as to when they will be delivered to the farm.

Six training programs have been submitted and approved for the farm.

Problems: (See GAF 83-53)

1. Bureaucratic delay and lack of operating funds. Purchase and receipt of equipment - delay.
2. Inability to fix workshop and fence prior to arrival of equipment. Inability to level as cant survey till trees are removed from fields.

Plans for Next Month:

To continue to carry out GAF 83-25 POW at best possible speed allowable.

A.3.4-A Gebel Asfar Report GAF 83-53 (July 2, 1983)

To : Dr. Ahmed F. El Sahrighi - Director of Agriculture
Mechanization Projects

From : Gordon Stringer

Subject : Lack of proper progress at Gebel Asfar

The past three months at Gebel Asfar have seen very little of the POW accomplished. Our time frame for winter planting will soon be very critical. As example of some of the problems we cite:

1. Equipment - the equipment list was approved on 23 September, 1982. Checks were given to the suppliers on 12 January, 1983. As of 2 July 1983 none of the equipment from overseas has arrived.
2. Land use at the farm - we were first assigned office, shop and land area at the farm in November of 1982. Since the original request and assignment the land areas has been changed twice. This resulted in our receiving an area which required much more canal and basin work than the original assignment. The shop area has now been cut down to 54.5% of the original allocation.
3. Land clearing and tree removal - this program did not start until 22 May and the dozer drivers only work half days. No trees have been removed from the fields and the survey work cannot be done. This in turn holds up the leveling.

In January, 1983 we worked out a POW based on schedules possible at that time. We updated in again in April, 1983 to account for the then known delays. This schedule was judged to be too long. We are now at least two months behind on this program. We have completed all tasks over which we have control and which we do ourselves. However, we cannot proceed with the POW tasks as scheduled due to many delays and problems over which we have no control. For these reasons we are cutting back on what we expect to accomplish prior to the fall planting time.

We now urgently need your assistance on the following items:

1. Rapid removal of all bulldozed trees from the field.
2. Survey data to be run as fast as we can complete it so that leveling can start.
3. Supply of funding needed to carry out the farm activities - both from the project and from Dr. Shehata.
4. Assistance in removing bureaucratic delays which often take weeks to clear.
5. Approval to rent backhoe and ripper.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.5 In-Country Training Officer

Activity Report
April, 1983

Submitted by: Ibrahim El Gattas

Summary:

During this month there is no positive activity being done except a few number of tour visits to the project locations. The main reason of this etagration is the USAID funds have not arrived yet. The effect is that many claims from different quarters we deal which have accumulated without paying for more than four months.

Plans for Next Month:

Procure training funds.

April, 1983 - Training Schedule

<u>DATE/TIME</u>	<u>LOCATION</u>	<u>COURSE NO.</u>	<u>COURSE TITLE</u>	<u>COMMENTS</u>
<u>MACHINERY MANAGEMENT EXTENSION</u>				
Apr. 4 - Apr. 5	Shiek Ahmed	3 EX 44.1	Lazer Op/ Maintenance	6 Trainees
<u>LOCAL MANUFACTURING</u>				
April, 1983	Behera Co.	3 LM 1.4	Industrial Technology	3 Trainees
<u>TRAINING UNIT</u>				
April, 1983	AUC	3 T 22	English Language	14 Students
April, 1983	Cairo Office	3 T 5.4	Computer Operation	1 Student
		4		24

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.5 In-Country Training Officer

Activity Report
May, 1983

Submitted by: Ibrahim El Gattas

May, 1983 - Training Schedule

<u>DATE/TIME</u>	<u>LOCATION</u>	<u>COURSE NO.</u>	<u>COURSE TITLE</u>	<u>COMMENTS</u>
<u>MACHINERY MANAGEMENT EXTENSION</u>				
May	Sharkia	3 X 18.1	Peanut Planting	12 Trainees
May	Project Villages	3 EX 24.1-.15	Wheat Harvesting (Mower/binder)	150 Trainees
May	11 Locations	3 EX 45.1-.11	Combine Harvesting of Wheat (Dentz/Fahr 980)	110 Trainees
<u>LOCAL MANUFACTURING</u>				
May	Behera Co./ Shiek Ahmed	3 LM 1.5	Wheat Threshing with the Berky-Threshers (4)	100 Trainees
<u>TRAINING</u>				
MAY	AUC	3 T 22	English Language	14 Trainees
				Total: 386 Trainees

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.5 In-Country Training Officer

Activity Report
June, 1983

Submitted by: Ibrahim Hassan El Gattas

Summary:

Ramadan is generous and therefore we finalized office work preparing for next month activity as prescribed below.

We also paid visits to:

1. Maamoura Training Center.
2. Behera Co.
3. Fayoum
4. Beni Suef
5. Minia

Plans for Next Month:

Training courses planned to be carried out next month:

1. Locally:
 - a. Tractor drivers: 2 courses in Minia 10/7/83.
 - b. Bulldozer drivers: 2 courses in Gebel Asfar (10/7/83)
 - c. Carpenter: Gebel Asfar (17/7/83).
 - d. Welder/Blacksmith: Gebel Asfar (17/7/83)
 - e. Building: Gebel Asfar (17/7/83)
 - f. Industrial Security: Gebel Asfar (23/7/83).
2. Centrally:
 - a. Maamoura.
 - b. Mechanic Level I for 15 trainees (Land Improvement 16/7/1983).
 - c. Mechanic Level II for 15 trainees (Land Improvement).

June, 1983 - Training Schedule

<u>DATE/TIME</u>	<u>LOCATION</u>	<u>COURSE NO.</u>	<u>COURSE TITLE</u>	<u>COMMENTS</u>
<u>MACHINERY MANAGEMENT EXTENSION</u>				
June	Project Villages	3 EX 24.16-.31	Wheat Harvesting (Mower/Binder)	150 Trainees
June	9 Locations (2 of them in project villages)	3 EX 45.13-.21	Wheat Combine Harvesting	90 Trainees
June	Quesna, Shiek Ahmed	3 EX 44.2	Wheat Straw Baling	6 Trainees
June	Quesna	3 EX 22.1	Maize Planting	12 Trainees
June	Sharkia Gov.	3 EX 37.1-.65	Land Leveling	650 Trainees
June	Sharkia	3 EX 22.2-.66	Rice Planting (direct seeding)	650 Trainees
<u>LOCAL MANUFACTURING</u>				
June	Behera Co./ Shiek Ahmed/ etc.	3 LM 1.6	Wheat Threshing	50 Trainees
<u>TRAINING</u>				
June	Cairo Office	3 T 5.6	Computer Operation	1 Trainee
Totals:				158 Courses
				1,609 Trainees

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.5-A Technical Training Combine Officer

Activity Report
June, 1983

Submitted by: Salah Bakar

Summary:

A training course was carried out for operation and maintenance of the combine at the Maamoura Training Center, in collaboration with the German Expert.

The follow-up on the transportation of the combines from Alexandria to El Shiek Ahmed, the participation of its preparation, assembling and operation in working areas.

Experimentations were carried out in the project villages.

Maintenance procedures and follow-up were taken care of jointly with the German Expert and the company.

Some repairs of the combines were made, due to ways of and methods of operation.

Follow-up on operating procedures and maintenance in all project areas.

Problems:

Lack of transportation means for combines to be transferred to project sites.

Lack of operating plans.

Damage of engines or motors due unpaved roads.

Unavailability of spare parts.

Unavailability of compressors effects the efficiency of operation.

Plans for Next Month:

1. Compilation of all damages of all machinery.
2. Preparation of a special information booklet concerning daily and periodical maintenance of machinery.
3. Preparation of a training course to increase the number of trainees.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.6 Participant Training

Activity Report
April, 1983

Submitted by: Samir Shawky

Summary:

Academic Training:

In addition to the 5 candidates in processing, 2 more candidates are in processing as follows:

1. Nader F. Meleka
2. Hassan Yehia Mohie Khalil

210 of the candidates for the academic training attended the screening test till April 26, 1983.

Non-Academic Training:

1. Non-academic training travel schedule is approved by Dr. El Sahrighi.
2. 8 groups - 56 participants are in processing by USAID as follows:

<u>S.P.</u>	<u>No. of Groups</u>	<u>No. of Participants</u>
Soil Improvement	2	4
Extension	2	20
Training	2	20
Farm Management	1	10
Research and Development	<u>1</u>	<u>2</u>
	8	56

Other groups are ready for processing.

English Training:

14 participants are in English courses.

Problems:

Training officers in the governorates are needed to follow up the training activities and to assist in preparing and collecting different forms and documents needed for participants training.

Assistance for the participant training is needed as the P.T. activities increase.

Plans for Next Month:

- Collecting the remaining forms for the non-academic group and put them in processing as soon as possible.
- Language training for the new candidates for the academic fellowships.
- Processing the ready candidates for the academic training.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.6 Participant Training

Activity Report
May, 1983

Submitted by: Samir Shawky

Summary:

Academic Training:

- 250 candidates attended the screening test.
- List of candidates for each fellowship and their report is prepared.
- 5 candidates attended the TOEFL test.

Non-Academic Training:

4 more groups - are in processing by USAID as follows:

<u>S.P.</u>	<u>No. of Groups</u>	<u>No. of Participants</u>
Soil Improvement	1	4
Extension	3	39
Planning and Evaluation	<u>1</u>	<u>7</u>
	5	50

The saturation is as per the attached sheet - except the 3 courses marked by X.

English Training:

14 participants are in English courses.

Problems:

T.O. in the governorates are needed.

Plans for Next Month:

Processing the participants training academic - non-academic through USAID training departure.

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.6 Participant Training

Activity Report
June, 1983

Submitted by: Samir Shawky

Summary:

Academic Training:

- 6 candidates are in processing by USAID.
- The result of the screening tests are ready.
- Lists of the candidates are ready for each fellowship according to their ALIGU scores.

Non-Academic:

- 16 groups of participants, 132 members are in processing for technical non-academic training as follows:

<u>S.P.</u>	<u>No. of Groups</u>	<u>No. of Participants</u>
Training	2	21
Extension	7	82
Farm Management	1	11
Evaluation	1	6
Soil Improvement	3	10
Research and Dev.	2	2
	<u>16</u>	<u>132</u>

English Training:

No courses till September.

Problems:

All observation tours are delayed, we can't start any of them in the proposal starting dates because of the USAID training department; they are not familiar with training in the third world countries - contacts are still being carried out between these countries and AID concerning future visits by participants. Concerning those traveling to the USA, no final decision has been made therefore visits will not be affected as scheduled.

Plans for Next Month:

Processing of participant training.

Join the training observation tour to the USA.

PARTICIPANT TRAINING STATUS

AS OF JUNE, 1983

No.	Course Number		No. of Participants	Type of Study	Time Frame
	Project	USAID			
1.	3T9	P.I.O.P. 00429	10	Observation/ Study Tour	Jan - Aug
2.	2T3	P.I.O.P. 00432	10	Observation/ Study Tour	October
3.	2EX48	P.I.O.P. 00434	10	Observation/ Study Tour	Jan - Aug
4.	2EX2	P.I.O.P. 00441	9	Observation/ Study Tour	Sept - Oct
5.	2EP3	P.I.O.P. 00436	11	Observation/ Study Tour	Aug - Sept
6.	3EX3	Group 1	13	Observation/ Study Tour	Jan - Aug
7.	3EX4	Group 6	13	Observation/ Study Tour	Aug - Sept
8.	3EX5	Group 3	13	Observation/ Study Tour	Jan - Aug
9.	3EX6	Group 5	13	Observation/ Study Tour	Aug - Sept
10.	3EX7	Group 2	12	Observation/ Study Tour	Jan - Aug
11.	3Si10	P.I.O.P. 90544	2	Observation/ Study Tour	Jan - Aug
12.	3Si3	P.I.O.P. 90557	2	Observation/ Study Tour	Aug - Sept
13.	3Si5	Group 4	4	Observation/ Study Tour	Aug - Sept
14.	3EP10A	P.I.O.P. 00438	6	Observation/ Study Tour	Aug - Sept
15.	3RDI	P.I.O.P. 00433	1	Observation/ Study Tour	Jan - Dec
16.	3RD2	P.I.O.P. 00430	1	Observation/ Study Tour	Jan - Dec
17.		P.I.O.P. 90556	1	Academic	Aug 83-Jan 85
18.		P.I.O.P. 90554	1	Academic	Aug 83-Jan 85
19.		P.I.O.P. 00428	1	Academic	Aug 83-Jan 85
20.		P.I.O.P. 90545	1	Academic	Aug 83-Jan 85
21.		P.I.O.P. 90555	1	Academic	Aug 83-Jan 85
22.		P.I.O.P. 90553	1	Academic	Aug 83-Jan 85
Total:			Observation/Study Tour:	130	
			Academic Study:	6	

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.7 Fiscal Report

Activity Report
April, 1983

Submitted by: Ahmed

The following is a summary of the fiscal report in local currency related to the referenced training subunit.

<u>Line Item</u>	<u>Budget</u>	<u>Expenditure</u>	<u>Total To-Date</u>
1. Instructors Fees:	<u>3,000.00</u>		
2. Equipment Rental:	<u>5,000.00</u>		
3. Petroleum, Oils, Lubs:	<u>1,000.00</u>		
4. Training Aids/ Equipment:	<u>4,000.00</u>		
5. Machine Operators Fees:	<u>500.00</u>		
6. Room/Board:	<u>5,000.00</u>		
7. Transportation:	<u>2,000.00</u>	<u>269.00</u>	
8. Expendable Train- ing Materials:	<u>4,000.00</u>		
9. Incidental Living Expenses:	<u>4,000.00</u>	<u>187.00</u>	
10. Training Center Fees:	<u>5,000.00</u>		
11. Administrative Expenses:	<u>2,000.00</u>		
TOTAL	<u>=====</u>	<u>=====456.00=====</u>	<u>=====</u>

A.3 EXTENSION/TRAINING SUBPROJECT

A.3.7 Fiscal Report

Activity Report
May, 1983

Submitted by: Ahmed

The following is a summary of the fiscal report in local currency related to the referenced training subunit.

<u>Line Item</u>	<u>Budget</u>	<u>Expenditure</u>	<u>Total To-Date</u>
1. Instructors Fees:			
2. Equipment Rental:		350.00	
3. Petroleum, Oils, Lubs:		4.70	
4. Training Aids/ Equipment:		10,603.85	
5. Machine Operators Fees:			
6. Room/Board:		3,063.25	
7. Transportation:		822.00	
8. Expendable Train- ing Materials:		6,811.98	
9. Incidental Living Expenses:		183.00	
10. Training Center Fees:		13,130.00	
11. Administrative Expenses:		25.80	
TOTAL	=====	35,054.58	=====
Outstanding Petty Cash/ Checks:		9,500.00	
GRAND TOTAL		44,554.58	

Demonstration/Training Equipment
Commodities

=====4,169.70

A.4 SERVICE CENTER/VILLAGE WORKSHOP SUBPROJECT

A.4.1 Service Center Development Program

Activity Report
April, 1983

Submitted by: Graham G. Sparrow

At the beginning of the month everything appeared to be going extremely well. We had actually allocated all the money available to the project for Service Centers and Village Workshops. The situation then, was what was the project going to do about the rest of the applications that were on file, with no funds available. While we would be able to process the remaining applications in progress, it was obvious that due to the infant slowness of the banks and the legal system, there would be a time in the very near future when the whole subproject would come to a stand still, unless more money was made available to enable us to continue processing applications.

Since last August when we were directed to work anywhere in Egypt the number of applications naturally increased but we tried to concentrate our efforts within the five governorates outlined in the project paper, it would appear that AID was not fully aware of our activities outside of the targetted area and have requested that we operate according to the project paper. Although an amendment has been requested to put Sharkia on a back burner so to say, due to the lack of response from that governorate, and to include Giza and Beni Suef where there is far more activity.

The position now is that we have clients who have purchased or are in the process of purchasing land to develop a service center outside of our working area which we cannot at present proceed with any further basically, we in the service center subproject have been trying to work between two sets of directives which I feel has placed us in an embarrassing position.

With regards to the banks and the problems they create one does get the impression that nobody wants to get to grips with this problem, basically the bank doesn't accept the terms of loaning money as laid out in the terms and conditions and are insisting to impose their own terms, this creates bad feelings between the client and ourselves and in the eyes of the client we don't appear to be doing anything about it effectively. It must be said that we have noticed a waining of interest on the part of the clients, and should this be allowed to continue we could find that some clients could withdraw from the project, this in itself would go badly for the project. (The saying a good word takes a long time to get around but a bad word spreads like wildfire) is very true here in Egypt.

We have completed two applications this month, but have been told to hold them back until the situation has been clarified as to whether they can be included as they are at present located outside the five governorates.

Applications at the bank are either waiting for approval from various Ministries or the clients are disputing the terms and conditions with the banks.

The first service center to start construction is in Minia, which has most of the civil work completed, the foundations laid and the steel frame work being delivered for erection. We were informed that the official opening day is planned for August 1st, 1983.

While we were in Minia we visited a small workshop client and were impressed by the work that he was doing, with the new tools and equipment he has requested it can only increase his productivity.

We think that we have found a new client for central Minia, we spent half a day discussing the projects aims and the terms and conditions we recommended that he thought about it very carefully before making any decision, but he requested to visit us in the office next week to discuss it further.

بسم الله الرحمن الرحيم

AGRICULTURAL MECHANIZATION PROJECT

A. I. D. Proj. NO. 263 - 0031

EGYPTIAN MOA/USAID

5 th. Floor - Building of the
General Society For Land Reform
P. O. B. 256 Dokki - Giza, A.R.E.

704660 - 704720

704364 - 707247



مشروع المكننة الزراعية
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الدرج الخامس - مبنى الجمعية العامة للإصلاح الزراعي
صندوق بريد ٢٥٦ - الدقي - جيزة ج ٢٠
٧٠٤٦٦٠ - ٧٠٤٧٢٠
٧٠٤٣٦٤ - ٧٠٧٢٤٧

DATE 3/4/1983 التاريخ

To : Dr. David Gaiser
Dr. Zakaria El Haddad

From : Graham G. Sparrow

Subject : Service Center Credit Fund

On reviewing the current situation of the credit fund, a clear picture has developed, in which it prompts one or two questions which require answers, otherwise we could be at the start of creating our own problems for the future.

The total amount of money requested
at present for Service Centers is L.E. 3,357,000

The total amount requested for
small village workshops is L.E. 1,042,560

TOTAL L.E. 4,399,560

The amount of money in the credit fund amounts to
L.E. 4,000,000.

Question 1: Do we continue to accept new clients, knowing that we possibly will not have any money to loan.

Question 2: Do we stop soliciting clients for both service centers and shop workshops, until a more positive situation develops or more money injected into the fund.

A.4 SERVICE CENTER/VILLAGE WORKSHOP SUBPROJECT

A.4.1 Service Center Development Program

Activity Report
May, 1983

Submitted by: Graham G. Sparrow

The two service center applications which we had processed which were outside our working area have been approved by AID and have this month been submitted to the respective banks. We are very pleased that the client in Beni Suef who had of purchased land to develop a Service Center there has been included in our project and will be allowed to continue his development program.

At the beginning of the month we met another client in Alexandria who desires to develop a Service Center at Kafr Dewar in Behera Governorate. He has already purchased two feddans for the service center and is revising his list of staff and machinery requirements.

Wagih Abo Zied and myself visited Beni Mazar to inspect the construction of Azmy's service center, we were pleased to find that the steel frame work had been erected and was in the process of being painted, a letter was sent to the bank releasing another 27,500 L.E. for the metal skeeting doors and windows, etc., to enable to continue the construction of the building, also specifications have been written for the invitations for bids on machinery required.

The current status of the service credit fund is listed below as of May 30th, 1983.

Funds expended by the bank	L.E.
Service Centers	82,500
Village Workshops	<u>174,981</u>
Total L.E.	<u><u>257,481</u></u>

Applications waiting for bank approval:

Service Centers	1,825,000
Village Workshops	<u>376,503</u>
Total L.E.	<u><u>2,201,503</u></u>

Applications of Project level

Service Centers	1,000,000
Village Workshops	<u>771,484</u>
Total L.E.	<u><u>1,771,484</u></u>

The amount of L.E. 4,230,468 is the total which has been allocated or spent as of the 31st of May, 1983. We are therefore at the present time unable to consider any further applications, unless a client withdraws from the project for one reason or another.

We will continue to process the remaining applications at present in hand, unless there is some movement of applications lodged and the bank, then the project will come to a standstill.

بسم الله الرحمن الرحيم

AGRICULTURAL MECHANIZATION PROJECT

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٧٠٤٦٦٠ - ٧٠٤٧٢٠
٧٠٤٣٦٤ - ٧٠٧٢٤٧

DATE 23/5/1983 التاريخ

To : Dr. Gaiser
From : Graham G. Sparrow
Subject : Conditions of Service Center Loan Fund

One of the fundamental problems facing the clients of the Service Centers is that of lodging the title of the land to the bank as collateral for the building and machinery content of the loan.

In most cases all land is registered in the family's name and may not have been registered for two or three generations, although the individuals of the family unit knows exactly what he/she owns. The problem is the time consuming process in processing the legal document action and then registering a sub-plot of land within that persons rightfull property.

If this bottleneck was removed then a flood of applications would be forthcoming from the banks and the loan fund would then become very active. As all Service Center clients are requested to invest a percentage of their own capital into the project would it be possible to:

- A. Remove totally the request for the land as security.
- B. Arrange some kind of leasehold with the family and/or individual for the life of the project or until such times that the documentation is in legal order. P.T.O.

Another point which must be settled with the banks is that of the clients contributions.

In our financial analysis we have to take into account that the client has to contribute a percentage to either the Building or Machinery or both, the end result is the amount of the total loan agreed what the banks are doing is deducting a flat rate of 10% from the loan value amount.

(Original Signed)

A.4 SERVICE CENTER/VILLAGE WORKSHOP SUBPROJECT

A.4.1 Service Center Development Program

Activity Report
June, 1983

Submitted by: Graham G. Sparrow

We have been able to finalize one application for a Service Center for BENi Suef this month and hopefully a second one will be delivered to the bank in Behera either by the end of this month or the beginning of the next (July).

Our whole operation has been curtailed this month due to the loss of both vehicles, Bob's Blazer's whereabouts are unknown and my car broke down on the 12th of the month and isn't finished yet.

This month one more village workshop, has taken delivery of machinery and tools, but no further development with regards to the Service Center's, which are awaiting approvals from the various ministries. It should be noted that the Egyptian management has sent out letters to some of the Service Center applicants giving them an ultimatum that if they don't produce all necessary documents within a time period, then the money allocated to them will be withdrawn and given to someone else.

It also came to light that other than Bob or myself, there is no one else with enough knowledge of machinery to even check that what the supplier has quoted is what will be delivered to the client, from experience with them it is obvious that they believe anything they are told by any of the would be suppliers.

One question which has been raised two or three times this month is overseas' training. I've been asked to recommend training in the United States by the four young engineers on our project. I haven't done anything in this regards, as some time ago Dr. Haddad told me, when I made a request in the past that I wasn't to get involved with the training of Egyptian staff, that was his decision.

At the end of the month I will be going on home leave and while there, will visit the International Agricultural Show, hopefully on my return the problem of transportation will be resolved.

A.4 SERVICE CENTER/VILLAGE WORKSHOP SUBPROJECT

A.4.2 Village Workshop Development Program

Activity Report
March, 1983

Submitted by: Eng. Moussa Shafik
R. Snyder

General:

Eng. Moussa was in the USA most of the month on a Procurement Training Program with the USAID group.

The question has been raised again as to how much we should become involved in governorates other than the five originally proposed in the Project Paper. If we are forced to abandon those we have already begun doing business with that are not in those five governorates, it will considerably reduce our L.E. volume of business.

The end result will be that we will have expended an enormous amount of time and effort for nothing.

Although it appears on paper that all of our funds are committed, we feel that a large amount of these projects, for one reason or another could fall apart. Considering this and the fact that such a small amount of our funds have actually been disbursed, we feel that we should continue as before until such time as we have a more realistic view of the financial situation.

There have been some rather steep price increases in locally produced machine.

Visits/Field Trips:

Eng. Wagih Abou Zeid and R. Snyder attended two meetings with the Sharkia Coop group and Dr. Salah Maksoud to advance development of the Coop workshop at Kiniyat village in Sharkia. We expect to deliver their request for a loan (L.E. 50,000) to the bank within two weeks.

Other workshop visits were as follows:

Beheira:

Damanhour	2
Kafr El Dawar	2
Delingat	2
Messin	1
Zawiet Gazal	1

Qalubia:

Benha	3
Meshtohour	2
Sandanhour	1

Sharkia:

Zagazig (PBDAC-Coop)	2
Kiniyat	1
Equa	1

Gharbia:

Tanta	3
Zifta	2

Kafr El Shiekh: (not in the original governorate)

Kafr El Shiekh City	3
Sidi Selem	3
El Hamoul	3
Desouk	5
Rhiad	1
Bela	

Fayoum: (not in the original five governorates)

Fayoum City	2
Sanarus	1

Loan Activity:

A. Funds expenditures for March were as follows:

<u>No. 1:</u> Mohamad Kohla, Delingat, March 10	L.E. 10,000
<u>No. 2:</u> Hassan Shalaby, Zawiet Gazal - March 15	L.E. 12,000
<u>No. 3:</u> Mahmoud Mahalawy, Benha March 31	L.E. 44,000
<u>No. 4:</u> Morsy Bagoury, Benha March 31	<u>L.E. 37,950</u>
Total Expenditures (March, 1983)	L.E. 103,950
Previous Expenditures	<u>27,637</u>
Grand Total as of March 31, 1983	L.E. 131,587

B. Status of New Loans:

	<u>Clients</u>		<u>Approx. Loan Amount</u>
1. Have bank approval No funds disbursed to-date	5	LE	225,000
2. Delivered to banks, but have not yet been approved	4	LE	85,000
3. Ready for delivery, to the bank (need translation and signature)	14	LE	300,000

Problems:

Translations:

Some of our work is being delayed due to the lack of translation services. Eng. Morad had made this service available for several weeks, but it seems to have fallen apart lately.

Office Space and Office Furniture:

Just another reminder that neither is adequate. This makes working conditions in the office deplorable at best.

Office Supplies:

We either have a very poor system or lack of a system for the procurement of office supplies. If the man hours wasted, waiting for copy machine paper, etc., were added up I'm sure it would be considerable.

PBDAC:

As of March 31st the PBDAC and our Project had not been coordinated to function together properly.

A.5 LAND IMPROVEMENT SUBPROJECT

Activity Report
2nd Quarter, 1983

Submitted by: Erroll D. Coles

1. Summary of Activities:

During May the subproject continued the land leveling demonstration program in the EWUP site in Abyuga and in the demonstration basin in Birba El Khobra Village.

Work at the EWUP site which began in March was completed on May 24. During the time the equipment was at the site, a total of approximately 90 feddan were leveled. The areas were primarily small farms leveled as one piece. One area of 15 feddan comprising of land belonging to 20 farmers was leveled as three pieces. In all cases, the areas leveled were chosen and indicated to the subproject by EWUP personnel. Because it is the policy of EWUP to make sure that its promises on project activities are carried through, the EAMP project staff worked in all areas indicated even if at great difficulty. We believe that at the end of the project's cooperation, a feeling of accomplishment and good will was shared by both projects inspite of personal disagreements which might have arisen.

The farmers response to leveling at the EWUP site was positive. This has been particularly true after farmers have had a chance to irrigate their lands several times. Farmers have come to subproject personnel reporting that irrigation times have dropped to 25% of the original time required. This has occurred on farms where the EWUP project plowed in long furrows at 110 cm. spacings. Farmers who did not shift to long furrows report that irrigation times are 30-40% of the original. Additionally, it was noted that several of the farmers who chose a short furrow/small basin methods used longer furrows than ordinarily. This means 10-15 meter furrows rather than 7 meter furrows.

EWUP should be thanked for its helpfulness in scheduling areas for leveling and for plowing land both before and after leveling took place. Similarly, it should be congratulated for following up and plowing in long furrow systems. The subproject should consider similar practices in plowing in long furrows in order that improved irrigation methods will be adopted.

On May 25, the subproject moved its equipment to Birba El Khobra village. Previously, the subproject's 45 kw tractor was sent to begin plowing the basin. This plowing took place using a plow provided by the Gamaya. Field work in the basin began on May 31 and was completed in June.

Then in June the subproject completed the leveling of all land in Abou Askar basin in Birba El Khobra village. The equipment was subsequently moved to El Beek basin in El Atlat village on June 23. Work in El Beek basin continued through July.

Abou Askar Basin - Work continued in the basin as farmers completed harvesting and threshing their wheat crop. The project's tractor with chisel plow moved onto each farm as it came clear. The scrapers followed as soon as sufficient land became available for leveling. The process was maintained efficiently enough that the tractors were seldom out of work. In order that the most efficient use be made out of the time between crops, long shifts were worked. In the future, it is recommended that two shifts be available for the time between crops. The farmers actively participated in the demonstration setting out field boundaries and harvesting their crops.

The LISP equipment also leveled a 15 feddan area in Birba El Khobra village at the request of the extension personnel. This area was to be used for demonstrating a soybean planter, and a long furrow system was crucial to the demonstration. The area was leveled over a period of three days.

El Beek Basin - Work in El Beek Basin was severely curtailed due to Ramadan holidays. Although the land was clear in early June, no work could take place until work in Abou Askar had been completed. This again points to the need to have two shifts during the height of the construction season. There was a further delay due to the fact that no farmers had plowed their land and no plow was available to the subproject from any source. Once the equipment arrived in the basin, the farmers began to do their own plowing. This situation raises a question which will be addressed in future planning: does the project plan to plow and level land as a package (whether as a free demonstration or for a fee). In the event that the project undertakes plowing, it must be able to meet the capacity of the leveling equipment. If farmers are to undertake the plowing, they must do it universally. Problems arise when some farms are plowed and other are not. In El Beek, many farmers with tractors and plows, did not plow their land, expecting that the project would do so.

A list of the farmers whose land was leveled is attached. It is unfortunate that the leveling of land in the basin was so delayed due to problems encountered working during Ramadan. Farmers will be planting their maize crop up to one month later than is planned. The farmers in the area did however, seem to prefer delaying the planting due to the rat problem they are currently encountering.

Results of the leveling are satisfactory and the farmers have expressed their satisfaction with the work. A number of them have adopted long furrows and were satisfied with the results both in terms of water spreading and irrigation time. Farmers in the basin irrigate using gravity, tambors and pumps. The fact that long furrows were not adopted by all farmers may be partly accounted for by the fact that those irrigating with gravity or tabor have very low head and as such are obliged to use the traditional small basin system. It is interesting to note that some of these farmers have doubled the length of the short furrows. A large number of small pumps are used by farmers in the basin, many of which were purchased with loans from the project's water lifting credit funds.

The remaining components of the rehabilitation plan, which included rehabilitation of meskas and improving the access roads, were not undertaken since the necessary equipment was not available to the subproject. Arrangement were made with the Governorate for a bulldozer for road improvement and with the Ministry of Irrigation (MOI) for meska rehabilitation, to undertake this work. This work is still upcoming, but it is now included in the MOI's plan in case of the main meska. The smaller meska is privately owned and remains the owner's responsibility. The project received the bulldozer from the Governorate in June, but since one wheel became damaged, it was not used to undertake any substantial work. It is unfortunate that this work was not completed since tractor access and water supply remain problems to farmers in the basin.

2. Extension Activities:

In May the subproject continued to coordinate its activities with those of the extension and training subproject. Various meetings were held between the two subprojects in both of which it was agreed that the extension subproject personnel in Minia would work on a trainee basis in choosing basins for development following the summer crop. Additionally, the Land Improvement Subproject will give this personnel a short course on land improvement methods and improved irrigation in July or August of this year.

A demonstration of siphon pipes and long furrow irrigation was held in Birba El Khobra early in June. The long furrow portion of the demonstration was successful. The siphon pipe portion received little acceptance. This is due partly to the fact that the meska had to be pumped full and then water diverted into a header ditch. Siphons were then run out of the header ditch. The farmers had problems learning how to start the siphons. The fact that the pumps must still be run and cuts be made in the bank to allow water into the header ditch before the siphons are used, is discouraging to the farmers.

In the future, simple surveys to determine water levels followed by system design should be undertaken before the demonstration. This may avoid some of the problems which were encountered.

Coordination with the extension subproject and with extension field staff continued in July. This has included extension cooperation in the current demonstration program, leveling of extension demonstration areas and selection of basins for the fall construction season. The subproject's staff also participated in two syphon pipe and long furrow irrigation demonstrations in the subproject's demonstration basins.

In El Beek basin, the project extension officer was instrumental in convincing farmers to plow their land once the land leveling equipment arrived at the basin. This was crucial to the subproject since no chisel plow was available from the local gamayas. This sort of cooperation is crucial to the basin rehabilitation program and should be encouraged in the future

development of the program. A similar activity that should be undertaken by extension workers is marking field boundaries within basins prior to the arrival of the land leveling equipment. This will greatly improve the efficiency of the leveling itself as well as satisfy participating farmers.

The extension personnel have assisted in selecting areas by visiting basins and drawing sketches of boundaries and collecting lists of farmers within each of the basins. They will also be active with LISP staff in the presentations given to farmers prior to topographic surveys and possible basin rehabilitation after reconnaissance visits by LISP staff have taken place. Potential sites have been identified in the three project villages of Abou Quarbas.

A siphon pipe-long furrow demonstration was given to farmers in El Beek basin on July 25, 1983. This demonstration, much like one previously given in Birba El Khobra village was not particularly well accepted. The fact that farmers must pump into a header ditch and then use the siphons is a major factor for this reception. The second factor is that the siphons require a great deal of effort in getting primed by the farmers. A system using a header ditch onto which the long furrows open directly was suggested to several farmers. This seems to have given good results and gained much more farmer acceptance. In the case of level basin irrigation, this may be the most appropriate method. The sub-project, in cooperation with the extension subproject, intends to demonstrate spile pipes and canvas dams to farmers in the basins.

3. Training Activities:

In May a tentative training plan was finalized and recruitment of trainees began. Lists of trainees were requested from the Agricultural Departments of Minia, Beni Suef and Fayoum Governorates.

The training plan developed in draft form was approved and is in the process of being finalized. Initial efforts are being made to get funding on line in June.

In July a training program was finalized for training field operating staff this plan covers: 1) Operators; 2) Mechanics; 3) and Field Supervisors, for the full complement of equipment.

The training of operators consists of three discrete parts:

- 1) Driver training for one week in the Governorates,
- 2) Operator training in the Numbaraiya and Maamoura Centers, and,
- 3) Specialized training with laser equipment.

The driver training course was given to 20 prospective drivers in Minia. The trainees are proceeding to Nubaraiya for further training beginning August 5th. Similar arrangements are being made for Beni Suef and Fayoum.

Two courses for training mechanics for the subproject are currently underway in Maamoura. A Level I course for mechanics from Beni Suef and Fayoum and a Level II course for trainees from Minia.

A bar chart indicating the projected training schedule is attached unfortunately, scheduled courses have been delayed due to financial problems.

4. Land Improvement Organization:

Owing to difficulties of financing the full complement of equipment mentioned in the project paper; of recruiting suitable operators and of managing such a operation spread over three governorates; the land improvement subproject is being organized to provide a more efficient and effective demonstration capability.

In the first place a single field unit will be located in each of the governorates of Minia, Beni Suef and Fayoum. The field unit will be a self-contained entity consisting of the following:

- a. Seven, 65 kw tractors and scrappers with laser control.
- b. Two, 45 kw tractors with chisel plows.
- c. One, 83 kw four-wheel-drive tractor for drawing a rotary ditcher and mole plough.
- d. One, 119 kw tractor for drawing a heavy, off-set disk harrow, a sub-soiler or a backhoe.
- e. One, digger/loader for providing access across ditches and along roads.
- f. One, service truck for lubrication and minor field repairs.
- g. One, small personnel carrier for supervisor and field survey staff.
- h. A central security area, building for equipment storage, workshop and office. The actual operating costs for the three demonstration units activities for the year has been estimated as follows:

1. Operating costs	L.E.	80,000
2. Supervisory and Operating Personnel	<u>L.E.</u>	<u>92,000</u>
	L.E.	172,000

This money will be allocated from the Research, Demonstration and Training component.

Secondly, operating personnel for the field units have been recruited from the respective governorates and are now being trained. The details of the training program are given in a later section.

Thirdly the problem remains of recruiting and selecting supervisory and management personnel for this complete engineering

operation. However, recruitment is progressing and training of the recruits will follow during the next quarter.

A clear understanding of the basin rehabilitation program is required or the demonstration equipment will not be used effectively. Although the selection of basins and other contiguous areas, has been clearly defined in the "Criteria for Selecting Areas for Land Improvement Activities" (now in preparation), some misunderstanding still exists regarding why land is to be leveled. The operation known as precision land leveling (PLL) is intended to improve water distribution. PLL and on-farm irrigation design and basin rehabilitation is to also encourage and enable farmers to use long furrows instead of the traditional small basin/furrow methods of the Nile Valley. Land leveling can be divided into three categories; primary, secondary, and tertiary. The primary land leveling is a major earth moving operation. Secondary leveling is a landscaping operation. Tertiary leveling or (PLL) is minor earthmoving to improve water distribution. The work undertaken by the subproject is limited to tertiary land leveling by the equipment on hand and by conditions in the Nile Valley. The upper limit of the volume of earth moved should not exceed 100-150 cubic meter per feddan.

The second aspect of the land levelling operation that seems misunderstood is the fact that the work area has to be surveyed before the levelling can begin. By surveying we mean topographic surveying to obtain the elevational differences across the area is that the slopes and the earth volumes can be calculated.

In the context of basin rehabilitation a soil survey is carried out concurrently with the topographic survey, taking soil samples down to a depth of one meter at quarter meter intervals. The result of the soil analysis will provide information on the salinity and alkalinity status of the area and will indicate if gypsum is needed and how much should be applied.

Other details concerned with the condition of the canals (or meskas) and the farm roads will be obtained by the survey.

Finally, at this stage of implementing the land levelling demonstration the assistance of a social scientist is absolutely essential. Referring to Dr. P. Reiss's paper, "Farmers Perceptions of Changing Conditions and the Role of Extension in Minia Governorate" particularly to those farmers cited on page 21, such as the worsening conditions of soils and problems of soil and water. The point is that the "before" and "after" situation has been missed on those basins that have been levelled. That is a full season of project time has been lost. However, a program has been prepared for submission to the project director requesting the services of the Project Evaluation Advisor. This program will be called the "Socio-Economic Evaluation of Land Improvement in Selected Basins", details of which will be submitted shortly.

Without this integrated approach, or a systems approach to the basin rehabilitation program, a proper, effective operation could not be provided to the farmer.

Furthermore, with a detailed knowledge of the interactions of soil, water and cropping practices and the land improvement program an adequate extension program (including the training of extension personnel) can be drawn up. For example, on the basis of the current field work the training manual being compiled is being revised to provide a "Tool" better suited to local conditions.

Finally, the land improvement demonstration activities must be viewed as an activity demonstrating a method to improve a number of farming activities, land levelling to provide long furrows which in turn allows effective farm mechanization, long furrows require a greater head of water therefore the meska canal will have to be dug out and the water control structures may have to be reconstructed (by the local Ministry of Immigration Engineer), to get farm machinery to the farm the roads may have to be built up; existing alkalinity can be countered by applying gypsum and incorporating it properly, surface drainage can be improved by cleaning out drains. All this constitutes the basin rehabilitation program which this subproject is planning to demonstrate.

The purpose is not only to demonstrate the basin rehabilitation program (BRP) to the farmer - to popularize the package - but to demonstrate the BRP to the commercial or private sector too. The project has to be a potential profit-maker to appeal to a commercial enterprise. Hence the whole operation will have to manage in a manner that approaches a commercial enterprise rather than that of a bureaucratic based activity. The personnel selected for the management will require special training to develop their skills in this direction.

In order to implement the demonstration program additional equipment and machinery will be required. To maintain and service the field equipment mobile service trucks will be needed to keep the operation going. Besides this a small base workshop capable of carrying out more extensive repairs and maintenance, including a stores and office area and a covered parking area have requested.

The problem of transporting supervisors remains a problem. The project does not have the complement of vehicles for this subproject, bearing in mind that only two vehicles were provided for in the project paper. Now, with the changing situation additional transport will be needed to get this program underway and provide for the proper supervision of the field work. Besides supervision, transport is needed for activities concerned with the selection of basins, field surveys and extension activities. Four off-road vehicles have been requested for this purpose.

The balance of equipment was listed in the first paragraph of this section.

5. Land Improvement Training:

a. Land Improvement Training Program:

The new approach taken to implement the land improvement activities required an organization of the training program.

Each of the three governorates where the field demonstrations are to be carried out, have agreed to provide the operating maintenance and supervisory personnel.

These personnel will be trained at the Maamoura and Nubaria Training Centers. However, the operators will also be trained by the small L.I. training unit. The "Training" operators will also assist in supervising the new field unit operators.

Altogether 75 personnel will be trained, from the three governorates, together with 8 other personnel who will be involved in the management of the field demonstration implementation.

b. Extension Training Programs:

In the course of the current field work it became apparent that the benefits of land improvement would not accrue to the farmers, such as long furrow irrigation, higher density plant population, better methods of water application, for example, unless an active extension service is provided. Furthermore, the extension personnel will have to be trained in the various aspects of land improvement. To this end a comprehensive manual is in the process of being compiled. Compilation of this manual is progressing satisfactorily. The manual is compiled in the form of a series of lectures, however, to give a more appropriate level of instruction the lectures will be divided into two parts, a more appropriate, applicable form in the preliminary part and a more technical dissertation in the second part. This expansion is progressing slowly but should be completed shortly.

A preliminary course will be arranged for the project village extension personnel in October/November. This program will be conducted as an on-the-job course consisting of working in the field with subproject personnel, going through the whole land improvement activity, the topographic surveying, soil surveying and socio-economic survey; following the plan preparation then presenting the plan to the farmers. Though the actual field work may be of interest to the extension personnel only a short time will be spent in the field. Finally, the extension agents will participate in the follow-up in demonstrating the irrigation methods and other technical innovations. Half the time will be spent in the field and the other half in lectures presenting the appropriate parts of the manual.

In addition to the village extension agents a seminar will be held in each of the governorates for more senior persons concerned with policy. The seminar would not be longer than a day and the first seminar should be held later in year when we have the field work going say, November or December. A second seminar of 2 or 3 days will be held for Markaz personnel at about the same time.

c. Equipment and Machinery Procurement:

The second procurement of 25 units of laser control equipment and 3 transmitters arrived in mid-July and are being processed through the customs.

The tractors will arrive in mid-September and since they arrive in a knocked condition they will be assembled ready for delivery about the end of September or mid-October. On delivery the tractors will be stored at Gebel Asfar. The first unit of tractors will be moved to Minia. The laser equipment will be fitted at Gebel Asfar, in late October.

Information has been obtained from the suppliers, Allied Products, agent in Cairo who informs us the balance of the implements will arrive on September 5th.

A specification for the 25 modified Bahera 3 m. scraper has been submitted to the manufacturers.

Specifications for other equipment and machinery has been mentioned elsewhere.

d. Field Surveys

The whole field survey program has been at a stand-still for this quarter as well as the first quarter, because of the lack of transport. This also means that the selection of basins, together with the necessary pre-extension activities amongst the farmers, is behind schedule.

The field survey program is largely dependent on the availability of basins free of growing crops and the target basins have to be examined periodically to check the crop status, thus the program is opportunistic and great mobility is required to execute the fieldwork in order not to impede the farmers cropping program.

A number of selected basins will be surveyed early in the next quarter as the subproject has been allocated another vehicle.

6. Changes for the Field Work:

The question of the farmers paying for the land improvement work arises frequently. At this point in time, the demonstration of the work to the farmers should be free of charge. However, once the concept has been popularized amongst the farmers, the methodology and management refined to a greater degree of efficiency and demonstrated to the private sector as a workable proposition and finally, a proper costing basis based on actual observed operating cost factors, then the farmer should be asked to pay for this work. The timing of this point will be considered during the final year of the project, that is 1985.

7. Activities during the coming Quarters:

The following outline of activities are not given on a time framed basis but as groups of activities:

1. Third Quarter:

- a. The training unit tractors (4) laid up for servicing.
- b. Operator and Mechanics from Minia trained at Maamoura and Nubaria.
- c. Laser equipment released from customs and stored at E.C.C. (Spectra Physics) who will be assembling and testing the equipment. They will fit the laser equipment to the tractors at Gebel Asfar.
- d. The tractors from Ragab are expected to be ready for delivery toward the middle of September and arrangements have been made with the Ragab company to deliver the tractors to Gebel Asfar for storage and for fitting the laser control equipment.
- e. The two basins in each village selected in Minia will be surveyed and planned prior to work commencing in the last quarter.

2. The Fourth Quarter:

- a. The first field unit of two 45 kw tractors and diesel ploughs, seven 65 kw tractors and scrapers should be moved to Minia and training of the operators started in one or the other of the available areas or Abuha, whichever is available. This assumes the timely delivery at equipment. (It should be noted our past experience has shown that it takes up to three or more weeks for an operator to understand the land levelling work, therefore not to strain our limited trained personnel of four operators only one unit will be trained, once proficient the next unit for Beni Suef will be trained, finally the Fayoum unit will be operative.)
- b. Toward the mid-November or early December the second unit will be moved to Beni Suef and training will begin there.
- c. However, early in October the field survey team will select basins and carry out the required surveys. Once six or seven basins have been surveyed the team will move to Fayoum and survey the required number of basins.

3. The First Quarter - 1984:

- a. It is anticipated that the last demonstration unit will be put into operation once the operators complete their training and all the equipment and machinery is available.

7. Personnel:

There are three persons on training courses in the U.S.,, being Dr. A. Orabi, expected back by mid-August, Dr. A. El Arabi and Eng. Hassan El Bana are expected back by early September. The remaining three persons are in Minia supervising training.

Appendix A

El-Berba village - Abu Korkas Markaz.

Abu Askar Badin

<u>Name</u>	<u>F.</u>	<u>Area</u>	<u>K.</u>
1. Mohsena Ahmed Housin	1		-
2. Hamdy Abd El Aziz	1		-
3. Abd El Hakim Ahmed	-		12
4. Kakmet Ahmed	1		12
5. Abd El glal Hassanin	-		7
6. Fathy Ebrahim	5		-
7. Thabt Salib gadelah	1		12
8. Abu Zid Hassan	1		3
9. Ahmed Abu Zid Hassan	2		6
10. Fatmah Aly Younis	1		3
11. Mohamed Aly El Shimi	1		12
12. Nafie Gomah Hassan	1		4
13. Shafei Gomah Hassan	2		-
14. Gomah Hassan Houssin	2		-
15. Abd El Hamed Taha	3		16
16. Esmael Mohamed Hossin	1		21
17. Johim Esmael H]ssin	1		15
18. Fathi Ebrahim	1		12
19. Abd El Latif Ali Ali	-		12
20. Ebrahim Ali Ali	-		7
21. Atiyat Ali Hassan	-		6
22. Makram Mohamed	1		12
23. Fath Elah Ebrahim	1		11
24. Abd El-Aziz Osman	1		2
25. Makram Osman	1		2
26. Fakhri Ellithy	-		21
27. Mamdoh El-Lithy	2		3
28. Abd Elah M'hamed	1		12
29. Mohamed Moubark	-		16
30. Helmy El-Lithy	2		-
31. Farghali Mohamed	1		-
32. Fatoh Ebrahim	-		16
33. Khald Abo-Zid	-		7

<u>Name</u>	<u>F.</u>	<u>K.</u>
34. Nabil Abo-Zid	-	2
35. Mohamed Abo-Zid	2	7
36. Ghatas Habib	1	2
37. Ebrahim Shok-Elah	1	2
38. Ahmed Nagati	-	17
39. Abo-El-Ala Mohamed	-	17
40. Hamad Ali M'hamed	-	9
41. Fath-Elah Ebrahim	-	-
42. Ragab Gaefer	-	12
43. Mohamed Abd-El-Rahman	-	12
44. Ahmed Ali Hassin	-	12
45. Mohamed Makhlof	1	12
46. Azat TRlinoss	1	12
47. Mohamed Radwan	-	12
	<hr/>	<hr/>
	57	2

Abguha-EWUP Site

Farmers Name	Area Qrats	Farmers Name	Area Qrats
Ebrahim Abdel Rohman	34	Abdel Rohman Ahmad	12
Abdel Sattar Abdel Aziz	12	Solyman Ebrahim	11
Foly Mohamed Sedeag	24	Fatoh Abdel Salam	51
Abdel Salam Elshebiny	120	Yousif Ali	11
Ali Ahmed Ali	35	Helmy Mohamed Galal	36
Radwan Mahmoud	9	Fatheyra Abdel Malak	36
Esmail Radwan	26	Ebrahim Elkoms	18
Thabit Ghattas	17	Abdel Hamid Abdel Hady	13
Abdel Atty Saliem	16	Abdel Tawab Abdel Kader	8
Abdel Nady Saliem	16	Abdel Dayem Abdel Kader	8
Ahmed Saliem	16	Abdel Hamid Abdel Hady	16
Rezek Farage	12	Abdo Seif	8
Kamel Goda Solyman	20	Sayed Elgamal	12
Thabit Ghattas	14	Abdel Daym Abdel Kader	12
Abdo Seif	4	Abdel Tawab Abdel Kader	12
Abdel Tawab Abdel Kader	4	Abdo Seif	12
Abdel Dayem Abdel Kader	4	Kotob Abdel Hady	10
Dosoky Khalil	4	Abdel Hamid Abdel Hady	13
Kotob Abdel Hady	16	Fawzy Yqusif	18
Ali Mahmoud Ahmed	8	Hamam Nazim	10
Abdel Moneam Abdel Meqsod	8	Abdel Hamid Abdel Hady	10
Abdel Tawab Abdel Kader	4	Fatma Ahmed Mohamed	7
Abdel Dayem Abdel Kader	4	Abdel Tawab Abdel Kader	4
Ali Mahmoud Ahmed	8	Abo Seif	4
Showky Morsy & Hamam Lazim	12	Abdel Daym Abdel Rador	4
Mohamid Raeap	8	Abdel Meneam Abdel Maksoud	8
Mohamed Abdel Hakiem	12	Ali Ahamed Mwhamed Hamada	8
Sayed Elgomal	4	Abdel Hamid Kasim	11
Shawky Habib	16	Wahba Thabit	17
Abdel Hamid Abdel Hady	5	Wadea Thabit	31
Thabit Ghattas	28	Salah Mohamed Abdalla	24
Helmy Mohamed Mosa	7	Mohamed Hossim Ali	10
Hossin El Kazaz	8	Nagaty Abdel Rehim	16
Kotab Abdel Hady	14	Abdellah Mohamed	7
Ali Abdel Rehim	22	Esmaeal Selim	12
Ali Seliem Ali	24	Solyman Abo Ella	22

Farmers Name	Area Qrats	Farmers Name	Area Qrats
Saleh Mekaeal	12	Abdel Aziz Abdel Gelil	30
Eaid Somyh	24	Mohamed Ali Ahmed	40
Salah Refaey	64	Exhaq Yousif	10
Maawad Gerges	10	Ezat Ahmed Hassan	16
Yeyers Abdel Malak	12	Wahba Rozik	10
Fawzya Wadea	12	Gomea Mohamed	8
Abdel Hamid Kasem	12	Tagy Solyman	12
Abdel Aziz Abdel Gelil	12	Farouk Gad	12
Mostafa Abdel Hamid	12	Nabil Aaly	12
Farouk Sayed	90	Morgos Aaly	12
Ahmed Abdel Aziz	20	Sayed Ahmed Abdel Wahed	18
Ahmed Abdel Motogaly	8	Kalifa Ahmed Abdel Wahed	24
Osman El Madah	30	Farouk Gad	7
Hamida Abdel Kader	11	Motawea Abdel Raboh	8
Mohamed Ali	12	Fatma Mohamed Saeed	8
Moawad Gerges	8	Farouk Gad	8
Hossin Abdel Latif	11	Farid Yonan	48
Fawzy Wadea	12	Ahmed Abdel Aziz	11
Abdel Rohman Abdel Mawgood	14		
Hassan Kotob	6		
Gayed Yonan	13		
Shehata Khalil	6		
Abdel Zaher Hamad	7		
Mohamed Abdel Kafar	15		
Mohamed Abdel Noeam	8		
Salah Refacay	60		
Osman Mahmoud	24		
Mohamed Ramadan	12		
Hamdy Ramadan	18		
Mohamed Abdel Baky	12		
Hassan Mohamed	12		
Sadek Adeab	16		
Kamel Adeab	16		
Mohamed Abdel Hamid	24		
Ahmed Mohamed Hassan	16		
Mohamed Abdel Baky	24		

Farmers Name	Area Qrats	
Awad Sayed	12	
Hassan Mohamed Haman	12	
Hassan Abas	12	
Abdel Any Ahmed	12	

Appendix B

LAND IMPROVEMENT SUPERVISORY AND OPERATOR TRAINING PROGRAM

1. The proposed training program is required to provide supervisory personnel, mechanics and tractor operators for the equipment procurement expected to arrive in Egypt by the third quarter of this year.
2. The proposal that Land Improvement Demonstration field unit is based in Minia, Beni Suef and Fayoum governorates. Further, the personnel should be recruited from each of the governorates, through the Under-Secretary's office. The merits in recruiting personnel from each governorate are, the costs and problems of transporting persons, per diem costs and provision of housing. The number and kind of persons will be given.
3. Nominally, the personnel will receive basic training in tractor maintenance and operation; the mechanics who are assumed to be Journey men, should participate in a secondary and advanced training program. This training will be provided by the Training Sub-project.

However, on the job training in land levelling, ditching, mole ploughing etc. will be provided by Land Improvement sub-project personnel.

The work plan is shown in the attached schedules 1(A), 1(B) and 1(C)

4. The number of personnel required are shown in schedule 2, which is taken from a previous memo. This shows the final number of personnel required; however, four or five additional persons in categories 3,4, and 5 will be included in the training program to allow for losses.

Training in the categories 6,7,8, and 9 will not be required.

5. Schedule 3, shows the number and kind of personnel that should be recruited from each of the governorates.

The recruitment of these personnel should commence as soon as possible and not later than June 1,1983 at the latest (or as may be suited to Training Subproject Program). The L.I. Subproject persons responsible for this aspect of its activities are, Eng.Hassan El Banna and Eng. Amr Marie and they should be provided with a vehicle and the prerequisite authority to select and recruit these personnel from the Beni Suef and Fayoum governorates.

6. The brief job description of each category follows

- 1) Senior Supervisor

Mechanical Engineering graduate, age not more than 40 years, background experience in management of agricultural machinery.

- 2) Field Supervisors

Agricultural Engineering graduates; age not more than 30/35 years, background experience in construction site supervision and or agricultural machinery operation.

- 3) Mechanic/Journeyman

Secondary school or technical school education; age 30/35 years; at least 10 years. practical experience repairing automotive equipment tractors preferably.

- 4) Mechanics/ Servicemen

Secondary or Technical school education age 20/25 years some experience in automotive or tractor repair preferred but not essential.

5) Operators

Secondary or technical school education, if possible; age 25/45 years, licenced drivers, experience driving tractors in older recruits essential, younger drivers will be trained.

The other personnel will not be recruited.

7. To date, some twenty persons have been recruited in Minia for this training program, but a further five will be needed.
8. The urgency of getting this training program under way is stressed; particularly to make the best use of the autumn period when the summer crop have been harvested so that the demonstration work can proceed in the selected basin units.
9. However, the selection of basins should proceed shortly so that topographic surveys can be carried out at an early date.

SCHEDULE 2

Operating Personnel For Land Improvement Field Work

CAT	DISCRIPTION	NO
1	Senior Supervisor	1
2	Field Supervisor	3
3	Mechanic/ Journeymen	4
4	Mechanic/ Serviceman	4
5	Operators	45
6	Drivers	8
7	Labourers	6
8	Clerks	4
9	Security	8
TOTAL		83

SCHEDULE 3

Personnel Recruitment from the Governorates for Training Program

CAT	DESCRIPTION	MINIA	BENI SUEF	FAYOUM
1.	Senior Supervisor*	-	-	-
2.	Field Supervisor	1	1	1
3.	Mechanics/Jouneymen	2	2	2
4.	Mechanics/Servicemen	2	2	2
5.	Operators	20	20	20
6.	Drivers**	3	3	3
7.	Labourers**	2	2	2
8.	Clerks**	2	1	1
9.	Security	4	2	2
		52	25	25

* Open for selection

** Not included in training program

SCHEDULE 1

	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1. Operators Course (Driving)						
A. 10 Minia	7 days	-----	-----	-----	-----	-----
B. 10 Minia	-- 7 days	-----	-----	-----	-----	-----
C. 10 Beni Suef	-----	7 days	-----	-----	-----	-----
D. 10 Beni Suef	-----	7 days	-----	-----	-----	-----
E. 10 Fayoum	-----	-----	7 days	-----	-----	-----
F. 10 Fayoum	-----	-----	7 days	-----	-----	-----
2. Operators Course						
A. 10 Nubaria	-----	30 days	-----	-----	-----	-----
B. 10 Nubaria	-----	30 days	-----	-----	-----	-----
C. 10 Nubaria	-----	-----	30 days	-----	-----	-----
D. 10 Nubaria	-----	-----	30 days	-----	-----	30 days
E. 10 Nubaria	-----	-----	-----	-----	-----	30 days
F. 10 Nubaria	-----	-----	-----	-----	-----	30 days
3. Land Levelling						
A. 10 Minia (completed)	-----	-----	-----	-----	-----	-----
B. 10 Minia	-----	-----	-----	-----	-----	-----
C. 10 Beni Suef	-----	-----	-----	-----	-----	-----
D. 10 Beni Suef	-----	-----	-----	-----	-----	1984
E. 10 Fayoum	-----	-----	-----	-----	-----	1984
F. 10 Fayoum	-----	-----	-----	-----	-----	-----
4. Supervisor Training						
A. Tractor Driving- Minia	-----	7 days	-----	-----	-----	20 days
B. Operator Training	-----	-----	-----	-----	-----	-----
C. Extension Course- Cairo	-----	-----	15 days	-----	-----	-----
D. Management Training Course - Cairo	-----	-----	-----	-----	-----	1984
E. On the Job Training- Minia	-----	-----	-----	-----	-----	-----
5. Mechanics Course (a) Mechanics from Beni Suef & Fayoum (b) Mechanics from Minia						
10 Nubaria or	I (a) 30 days	-----	-----	III (b) 30 days	-----	-----
El Monyra	II (b) 30 days	-----	-----	II (a) 30 days	-----	-----

A.6 LOCAL AGRICULTURAL MANUFACTURING PROGRAM

Activity Report
2nd Quarter, 1983

Submitted by: Richard K. Berkey

Semi Mounted - Threshing Machine Development Report:

After one year of development the decision has been made to begin manufacturing on a limited basis of 225 machines. The decision is endorsed by the manufacturing advisor because new machine research and development represents only a small proportion of the responsibility of the manufacturing advisor and the time has come to continue on into the problem areas of manufacturing.

Of the five machines completed only two are currently being tested due to the difficulty of finding crop on which to operate. In the course of the wheat/barley season, using unsupervised farmer operators, it has been difficult to conduct repeatable tests. Therefore the following observations are based on observations by the manufacturing advisor based on experience in other developing countries and discounting the normal resistance to change, scheduling problems, lack of responsibility, etc., inherent in such a program.

Most of the problems to date are related to:

1. Lack of operator skill.
2. No understanding of machine adjustment.
3. Lack of quality control in the prototypes.
4. Substitution of substandard materials in the prototypes.
5. Cutting of straw.
6. Adherence to old patterns in threshing system.
7. Lack of cost consciousness.

All of these have been or can be corrected with hard work.

Current Status:

A slightly modified machine has been operated on a sustained basis in barley and wheat at a rate of 4 feddans per hour with excellent results in terms of straw length, total losses, damaged grain, etc.

The modifications required for good straw cutting are relatively inexpensive and work being conducted to incorporate this removable cutter system into the overall design on a rational basis.

One and one half feddans of wheat have been stock piled at Gianacalis for further development work after wheat and barley on the farm are finished.

Preparations are being made to attempt threshing of minor crops, i.e. beans, pulse and berseem. If time permits we would like to try threshing peanuts before the onset of the rice harvest.

The remaining rice stockpile was threshed before the wheat harvest season and showed satisfactory performance of the machine in rice.

The current machine weighs about 1,300 kg. This would certainly result in manufactured costs more than 1,500 L.E. which is too high to sustain the growth of a balanced, sales, service and development program.

Axial Flow Thresher: (Allison Blanshine)

I offer the following thoughts on the basic design, manufacturing and operational problems relative to the Berky Axial Flow Thresher and some possible suggested improvements. The three main areas of concern are: Spiral bar threshing rotor, blower rotor of different speed, and three point hitch mounting of unit.

1. The spiral bar threshing rotor is not a rugged unit and it is very difficult to manufacture. To improve ruggedness it should be made of a center 3 or 4 inch tube with end shafts and the rings welded with pitched rotor blades to the new center tube. Spiral bars would be on edge rather than on the flat as is now done, or they can be welded to spider teeth as some are now. They would then be replacable when worn or damaged.
2. The present high speed blower rotor is very expensive and difficult to manufacture and is probably not necessary. Increasing the size of the blower to the housing outside diameter may provide adequate blow at cylinder rotor speed. Thus it would be mounted to the 3 or 4 inch cylinder rotor tube.
3. The three point tractor mounting of this unit is very unstable on the road with the resulting possibility of the operator losing control and causing a serious accident. A two wheel trailing unit would be much safer and easier to hitch and unhitch. It should be a low cost easy to manufacture rigid axle unit for slow speed transport behind the tractor.

The optional chain slat auger mechanical feeder doesn't improve feeding to any great degree because it is manually fed unevenly. Therefore it should be designed to improve manual feeding. It should be a 90° swing out table with a short rubber flight undershot (top side) feeder.

Also the entire thresher should be opposite hand with the in-feed on right rear and cylinder opposite rotation (right hand)

(clockwise rear). This will eliminate crossed belt drive thus a rigid 3 strand drive with simple outside idler safety belt clutch drive release.

As a research project I would suggest a complete circle or enclosed concave with free swinging knife edge hammers at the outlet or blower end. This would act as final straw cutters as well as discharge elements to move material topside to blower.

Preliminary Ideas for Local Agricultural Manufacturing:

1. Gianaclis Training Center has a large warehouse facility which is not active.
2. The Ministry of Agriculture intends to upgrade the site and has requested Dr. Kadeem and the Manufacturing Advisor to plan a farm machinery development center mini-manufacturing plant and procure machinery, tools and supplies and institute manufacturing/development/training on premises. The plan is feasible, costs and priorities are being developed.
3. The Behera Dredge Div. Shop is close by and can supply valuable assistance, i.e., machinery operators, procurements, etc.
4. The Indefinite Quantity Contract should avoid the transfer of ownership of capital equipment from project to Ministry of Agriculture until some criteria have been met. This will avoid current difficulty concerning ownership and responsibility for tools and capital equipment now pervasive in Agricultural Mechanization Project.
5. Materials and tools at concessional prices should be carried in stock. This will invite participation of suitable local manufacturing.
6. A delivery network and mobile demonstration workshops will provide the leverage for spontaneous formation of a Farm Equipment Manufacturers association.
7. Feasibility study for Farm Tool Manufacturing was scheduled to start in February according to approved work plan. We suggest initial use of the \$ 400,000 (Manufacturing Advisor allocation) for economic modeling of the threshing machine including:
 - (a) Farm Tool price elasticity model.
 - (b) Effective manufacturing cost analysis procedures for Egypt.
 - (c) Sales/service requirements.
 - (d) Capital requirements - rate of return - sources, etc.

Engineering Materials

List of Stock

Warehouse for U.S. Engineering and manufacturing equipment and capital equipment and experimental.

1. Fasteners :
 - (a) Complete stock of grade 5 bolts from 5/16 to 7/8 " UNC & UNF
w finished nuts, bolts and lock washers (5) Suppliers
 - (b) Complete stock of bin bolts.
 - (c) Drill quicks
 - (d) Socket head set screws flat head and socket head.
 - (e) Plow bolts
 - (f) Elevator bolts
 - (g) Lock nuts
 - (h) Rivets
 - (i) Cotter pins
 - (j) Key stock
 - (k) Tube fittings- hydraulic etc.
2. Complete stock of agricultural chains and accessories. Plus standard milling cutters for cutting ASA standard roller chain sprockets by index milling. (3) Suppliers
3. Stock of 4" - 6" - 8" auger flighting RH and LH/various pitches. (2) Suppliers
4. Stock of standard sickle knife sections, revets, cutter bar steel, mower guards, ledger plates etc. (4) Suppliers
5. Stock of Disc Blades, coulter blades, shovels in selected sizes. (2) Suppliers
6. Stock of heat treatable plate for shanks and plow parts. (2) Suppliers

con't

7. Stock of V-belts including double V, variable speed sections, poly V type, banded multiple and special types of complete range of lengths and in some quantity. (3) Suppliers
8. Stock of stress-proof shaft from 3/4 - 2 3/16" ϕ range. (2) Suppliers
9. Agricultural ball bearings, pillow blocks flangettes etc. 3/4 23/ 16 ϕ . (2) Suppliers
10. Precision forged bevel gears - range ratio & power. (2) Suppliers
11. Index milling spur gear cutters wide range number of teeth and from 3 DP to 10 DP. (1) Supplier
12. Gear blank quality round steel bar. (2) Suppliers
13. Agricultural tires, selected popular sizes. Also rims in selected sizes. (4) Suppliers
14. Agricultural Universal joints and drive line componenets in suitable range of sizes and with accessories. (2) Suppliers
15. Series of idlers & pulleys for belts and chain. (2) Suppliers
16. Series of low cost tapered roller bearings and shaft seals. (2) Suppliers
17. Needle bearings, radial and thrust, for series of shaft sizes and capacities. (2) Suppliers
18. Cold working die steel in bar and plate form. (1) Suppliers
19. Stock springs - spring steel wire strip etc. (2) Suppliers
(including die springs)
20. Standard reel fingers and pick up fingers of spring steel. (2) Suppliers

con't

2. Supply of salts and control equipment for carburizing and heat treating in conjunction with locally made furnaces and equipment. (1) Supplier
22. High strength low carbon sheet and plate for special application, (2) Suppliers
23. Stock of perforated sheet with development of local punching capability. (2) Suppliers
24. Sintered bushing stock. (1) Supplier
25. Special welding supplies, wire, special rod etc. (2) Suppliers
Machines.
26. Electric brakes (1) Supplier
27. Hydraulic cylinders valves, pumps lines, hoses & accessories.

About (50 suppliers of which about 20% could be common to different suppliers. Or (40) suppliers - 20 regular and 20 alternate.

* * * *

Floor Plan - Capital Equipment Stock for
Small Scale Factories

Press shear:

1. Press break - 2 sizes
2. Power shear - 2 sizes
3. Power Nibbler - Fixed and one portable with stand
4. Iron worker with punching capability - two sizes
5. Arbor presses - 3 sizes
6. Punch press - 2 sizes
7. Bulldozer - with gas muffle
8. Strippets
9. Die buttons, bushings

Maximum accessories for above basic machines machining centers

1. Drill presses - 3 sizes
2. Radial drill - QC etc.
3. Engine Lathe - 3 sizes, QC., TUR., ETC.
4. Vertical milling machine with slotting attach etc, rotary index.
5. Universal tool grinder
6. Hardness tester

Maximum tooling and accessories for above plus stock of perishable tools (drills etc.).

Forge, Weld and Heat Treat:

1. Arc welders - 3 sizes AC and portable engine driven & special.
2. Gas welder with cutting attach also pantograph etc. (2) sizes
3. Forge and pot heaters
4. Pipe benders
5. Ports - power ass'y equipment.
6. Various snag grinders.

Maximum tooling and perishable tools for above machinery.

con't

1. Complete set of hand held power tools.
2. Field tests support equipment. i.e. portable welder, oxyacetylene cutting, portable scales etc.

Inspection :

1. Complete micrometers - inside/outside telescoping gages etc.
2. Dial indicators
3. Surface plates - gages etc.
4. Vernier calipers
5. Optical comparitor
6. Jo. blocks
7. Sine plates.

Experimental procurement :

The warehouse should act as the agent for duty free import of selected form machinery for the purpose of testing, modifying, and / or copying. This can not be subject to normal AID bidder procedures.

This is a partial list off the top of my head based on experience with the thresher and needs to be expanded, tried and modified.

Office Equipment :

1. Programable caluclator w program library.
2. Drafting equipment
3. Typewriter
4. Blue print machine
5. Technical library
6. 11 X 17 copy machine.

* * * *

The original plan for the Manufacturing Advisor included a 4 step program as follows :

1. The establishment of a warehouse for stocking and supplying local and imported materials, supplies and capital equipment to small manufacturers to allow them to manufacture competitively and on a rational basis.
2. The establishment of a model small plant to train by manufacturing, for example threshing machines using the type materials, facilities and capital goods stocked by the warehouse. The trainees would be inexperienced engineers preparing for technical training in specially designed programs in the USA and potential lead men and manufacturing engineers from prospective small manufacturers.
3. The establishing of a mobile manufacturing workshop to make a circuit, training personnel at their own factory sites and introducing new methods and technologies plus delivering new capital equipment and supplies as required and servicing a pilot cottage industry assembly, sales, service experiment.
4. The development and / or adaptation of new farm machinery or capital equipment in order to produce it rationally in Egypt.

The original site was to have been on the Behera Co. premises. It has now been moved to Ganaclis and preparatory work is in progress to this end. Ganaclis is close enough to the port to perhaps set up a pilot free zone manufacturing facility. This would aid in infrastructure development which I believe the M.A. is willing and able to do except for time frame. Therefore, the location is probably a good one.

We have been spinning our wheels for over a year on procurement of capital machinery, experimental machinery for copying and imported raw and semi-finished materials and equipment. The problem is the chicken and egg problem or trying to get someone to import exactly what you want on their money.

con't

What I feel would work and would be comfortable to the M.A. would be to get this sub-project out of the training funds by inducing an Indefinite Quantity Contract for equipment and the services required for U.S. procurement and hopefully set a precedent which could unlock the gate for use of permanent operating capital.

The goods would be roughly as attached, The services would be that of bringing a procurement engineer into Checchi to assist in procurement and selection of the proper equipment for the pilot demonstration factory and an expert to assist in installation and organization.

* * * *

ANNEX B

EVALUATION OF THE WATER-LIFT LOAN FUND

AN EVALUATION OF THE WATER-LIFT LOAN FUND:

LOAN FUND OPERATION
CRITERIA FOR PUMP SELECTION
FUND IMPACT ON PURCHASERS

Peter Reiss

with

Abdel Azim Abdel Azim Zalouk
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3 April 1983

Agricultural Mechanization Project

TABLE OF CONTENTS

Summary.....	i
1.0 Introduction.....	1
2.0 Project Recommendations for Water-lifting.....	4
3.0 Operation of the Loan Fund	5
3.1 Loan Terms.....	5
3.2 Allocation and Distribution of Funds.....	6
3.3 Suggested Changes in the Loan Fund Terms and Allocation.....	10
3.4 Dissemination of Information Concerning the Loan Fund.....	11
3.5 Role of the Project's Mechanization Extension Agents.....	12
4.0 Pump Selection.....	13
4.1 Criteria for Pump Selection.....	14
4.1.1 Land.....	15
4.1.2 Crops.....	19
4.1.3 Water.....	20
4.1.4 Labor.....	24
4.1.5 Experience and Hearsay.....	26
4.1.6 Available Stock.....	26
4.2 Conclusions.....	27
5.0 Impact of the Fund on Pump Purchasers.....	28
5.0.1 Land.....	28
5.0.2 Crops.....	29
5.0.3 Livestock Management.....	30
5.0.4 Labor and Custom Work.....	31
5.0.5 Water.....	31
6.0 Recommendations.....	32
References.....	34

The following report is an evaluation of the Agricultural Mechanization Project's Water-lift Loan Fund, with particular attention given to the operation of the fund, the criteria used by purchasers to select a pump, and the social and economic effects of the fund upon the participating farmers. Three villages in Gharbia Governorate are the focus of the report. The three differ in their pattern of pump purchase: in one, large pumps were purchased; in the second, only small; and in the third, a full range exists.

Loan Fund Operation

With the activation of the Loan Fund in early October 1982, roughly 400,000 L.E., or one-quarter of the total endowment, was dispersed to pre-test and Project villages. The exact allocation was determined on the basis of certain village characteristics, including existing pump population, total cultivated area, and system of irrigation water use. Terms for the loans were mandated through the regional development banks to village banks, although the latter were given some latitude in determining the actual conditions for down payment and period of repayment. In the three villages selected for this report, each village bank chose different terms.

In all, 155,000 L.E. were distributed to the three villages under discussion. However, after six months of the fund's operation, slightly more than half of the money is still unspent. Furthermore, given the village conditions and terms of the loans, it appears unlikely that more of this money will be borrowed by villagers because of (a) saturation of the pump population making additional machines unnecessary or (b) undesirable loan terms which in their present form will not attract more borrowers. The greatest dissatisfaction with farmers has arisen over the period of repayment, which the Tanta regional bank has set from three to five years.

A plan for implementing the Loan Fund has called for the recruitment of a water-lift extension specialist, the dispersal of information about the Fund to villagers, and training for extension agents and purchasers in pump maintenance and repair. Thus far, the plan has not been carried out. As a result, the Project has effectively played no role in the Fund's operation. Farmers have not been informed about the Fund systematically; nor has assistance been provided concerning pump selection, maintenance, or repair. The recent recruitment of three water-lift specialists to the Extension Sub-project may help to alter the passive role the Project has played to date.

Since October 1982, more than four hundred pumps have been purchased through the Loan Fund. Figures available for the first three months of the Fund's operation reveal a decided preference for small pumps. Of the 284 purchased between October and December, 76% have five to six horsepower. Yet this pattern of purchase runs counter to Project recommendations that water-lifting is most cost-effective using 12 hp. pumps operating areas of at least eleven, and preferably forty, feddans. Two working papers produced by the Project have called for the retention of the saqia command area, but with its irrigation conducted by the members of the "saqia ring" using a shared pump. In operation, however, individual farmers,

rather than cooperating groups, have been the loan recipients. Nor has the saqia group remained as the basic organization; pump use has fractured the traditional saqia users' group. In fact, conflicts over access to the saqia among shareholders have driven many farmers to renting pumps, even before the Loan Fund's introduction.

Criteria for Pump Selection

Selection of a pump by Loan Fund participants was based on a number of factors: working farm size and access to rentable land, crops grown, water delivery and drainage systems, interest in undertaking custom work, experience with or knowledge of a particular pump, and recommendations and stock of the local pump distributor.

In terms of land, pump size selection was determined by the availability of excess land for rent, most usually put on the market by emigrants who were not able to conduct the agricultural work themselves. As a result, land has become concentrated in the hands of fewer people who have accordingly been able to increase their working farm size. In villages with few emigrants and little excess land, the terms of the renting arrangement between owner and user are seen to be counter to the interests of the latter, and consequently land rental is further discouraged.

While farmers in all three villages grow cotton, bersim, wheat, and maize, rice and vegetables and fruits are important cash crops in only some. Rice, described by farmers as one of the most water-demanding of all crops, is grown on large areas of two of the three villages. However, in one, large pumps were purchased, and in the other small. A deciding factor is the method of irrigation tied to this crop. In the former, rice is irrigated using water-lift methods, while in the latter only gravity-flow is used. In the third village, nearly half the total cultivated area is devoted to fruits and vegetables, which require water at less frequent intervals.

Many farmers purchased pumps to avoid continued participation in the "saqia ring." There is no intention to share the use of the pump with other saqia group members. Widespread dissatisfaction with the management of the saqia mitigates against the appeal of electrifying it or the likelihood of encouraging groups of saqia users to purchase a pump cooperatively and share its running costs. According to farmers in one village, the installation of tile drainage has required them to lift more water also leading them to choose larger pumps.

Most of the purchasers interviewed have decided not to use their machines for custom work. Renting a machine requires having a household member who will be responsible for managing its operation. Since hired labor is expensive and would be needed otherwise, many pump owners have chosen to use the machines on their own land only.

Pumps were often selected on the basis of second-hand experience with particular models. A more important factor is the pump selection offered by the machinery distributor.

Distributors appear to sell pumps of only a few companies and the narrowness of their selection is reflected in the limited variety of pumps purchased by loan recipients. Purchasers were also restricted by the available stock, and, in some cases, were given pumps other than what they had requested.

Fund Impact on Purchasers

Although in operation for only six months, purchasers have already begun to adapt their agricultural practices to their new acquisition. Changes have occurred in the amount of land rented, the crops grown, the system of livestock management, and in use of household labor.

As a result of having purchased a pump, many of the fund participants have decided either to rent land for the first time or increase the amount they ordinarily rent.

Every pump recipient has also spoken of his intention to increase the area of vegetable-growing on his land thereby increasing his income.

Purchasers have already noticed an increase in milk production by having taken their water buffaloes off the saqia. In what may be a widespread occurrence, one purchaser sold most of his animals and used the proceeds to purchase land to grow vegetables.

A number of purchasers intend to rent out their pumps for additional income. Such an activity requires a free member of the household to supervise the pumps' use.

Acquisition of a pump has given the farmers a greater degree of control over their agricultural operations. In the past, many complained, they had been unable to gain access to their saqia or find an available pump to rent.

Recommendations

Based on the report, the following recommendations are made:

(1) A thorough examination of the distribution of funds ought to be made immediately. In two of the three villages, no requests have been made to the village banks for more than three months, and more than half the money remains unspent.

(2) A Project member from the Cairo office should be directed to make regular visits to the participating village banks to facilitate the movement of money to farmers.

(3) Unspent money ought to be (a) made available to villagers on different borrowing terms, (b) directed to Project villages where a demand continues, or (c) made available to farmers from neighboring villages which fall under the same village banks.

(4) A concerted effort ought to be made in the future to advertise the Fund to farmers since nearly all learned of it through personal contacts or from farmers who had already

taken out loans.

(5) The Project's mechanization village extension experts should be directed to play a more active role in the operation of the Fund, particularly in the following areas: recruitment of Fund participants, providing suggestions about appropriate pumps to purchase, and giving advice about maintenance and repair.

(6) Assistance ought to be provided so that purchasers receive the pumps they request. Again, the village experts ought to play a role.

(7) The Project's call for the replacement of the saqia with pumps while retaining the same organization is unworkable and should be abandoned.

(8) As such, the Project might best put its efforts into reviewing the variety of low-horsepower pumps available for the purpose of recommending a preferred type or types. The recommendation ought to be based upon operating performance, availability of spare parts, and cost.

1.0 INTRODUCTION

This report represents an initial evaluation of the Project's Water-lift Loan Fund. In accordance with the agreement between the Egyptian and American governments, \$2,000,000 have been allocated out of Project funds to enable small farmers to purchase water-lifting devices on terms easier than are otherwise available. As the Loan Fund was first designed, farmers with holdings of less than one feddan were to be encouraged to form user's groups which would jointly purchase equipment and share its operating costs. Landless laborers, who in the past have been excluded from any loan consideration, were also identified as potential loan recipients if they could demonstrate an interest in undertaking custom work.

Since the activation of the Loan Fund in October 1982, more than four hundred diesel pumps have been purchased by farmers. Figures available for the period from October through December indicate the purchase of 314 pumps in three pre-test and twelve Project villages. Information concerning their horsepower have been provided for 284. Of these, 216 (76%) have between five and six hp. Thirty-four (12%) have more than ten hp., but thirty of these are concentrated in only three of the participating fifteen villages.

Clearly, there is a preference among purchasers for low powered pumps. Yet this pattern of purchase runs counter to Project recommendations that water-lifting is most cost-effective using twelve hp. pumps operating areas of at least eleven, and preferably forty, feddans. Consistent with the original guidelines for the Loan Fund, the Project has, in two working papers, called for the retention of the saqia command area and its irrigation by the members of the "saqia

ring" using a single pump. In actual operation, we find that individual farmers, rather than cooperating groups, have been the loan recipients. Nor has the saqia group remained as the basic organization with only the addition of a technological change. The introduction of the pump has fractured the group.

Given this divergence between the Project's recommendations and the Fund's actual operation, the Evaluation Unit has undertaken an investigation in an attempt to understand farmers' preferences for small pumps and to explain the intervillage variation. This report seeks to answer the following questions:

- (1) What are the criteria used by farmers for purchasing pumps?
- (2) Why do farmers in some villages uniformly select large pumps, while those in most other villages prefer smaller ones?

While the study was initially expected to address these points, its scope has been enlarged to cover the following which are considered to be necessary for an over-all evaluation of the Loan Fund:

- (3) How rapidly is money being distributed by the village banks, and what blockages can be identified?
- (4) What is the reaction of farmers to the terms of the loans, and what revisions ought to be made?
- (5) What role have the Project's mechanization extension experts played in the operation of the Fund, and what changes might be made to facilitate the selection and operation of the pumps by purchasers?
- (6) To what extent is it likely that the saqia organization will be retained despite a technological change?
- (7) What is the social and economic impact of the pump purchasers on the participating farmers, and what benefits have already been accrued by them?

Information used in this report was collected between 21 and 23 March from pump purchasers and village bank managers in three villages in Gharbia Governorate: Konayiset Damsheet,

Qalib Abiar, and Shabshir El Hesa. The villages were selected because they differ markedly in their distribution of pump sizes. In Konayiset Damsheet, farmers have preferred to buy large pumps, in Qalib Abiar they have selected small pumps, while in Shabshir El Hesa they have apparently purchased a wide range of sizes as the following table indicates:

THE NUMBER OF PUMPS PURCHASED BY HORSEPOWER

Village \ Hp.	5	6	7.5	8	10.5	11
Konayiset Damsheet	-	-	-	1	7	11
Qalib Abiar	26	-	3	1	-	-
Shabshir El Hesa	5	9	1	4	3	-

Of interest was the extent to which village conditions influenced the purchase the numns of different horsenower or whether distributions reflected the socioeconomic circumstances at the level of the individual purchaser's household. Should village conditions play an important role in influencing prospective purchasers, the Project might be able to identify the pump needs for villanages and consequently be able to determine with greater certainty a more equitable distribution of Project funds.

In all, sixteen pump purchasers were interviewed. Within each village, and as a group, they represent a wide range of landholdings, cropping patterns, employment activities, and household organizations. They differ in their reasons for purchasing a pump and in their strategies for its use. As a result, by examining this varied group of purchasers, the operation of the Loan Fund will be best highlighted.

2.0 PROJECT RECOMMENDATIONS FOR WATER-LIFTING

Two working papers (El Haddad et al. 1982 and Wissa et al. 1982) produced by the Agricultural Mechanization Project have focused on the financial and economic costs of different water-lift devices. These studies have argued that the most cost-effective means of water-lift is the 12 hp. diesel pump and recommend its replacing the animal-powered saqia. However, they also argue for the retention of the saqia group as an indigenous unit of water users and that the alteration of the saqia area, being a socially accepted structure, might prove unworkable (Wissa 1982:31). This group of water users, numbering as many as twenty, shares rights in a saqia and in its costs and repair. As joint owners they must seek a mutually agreed upon scheduling of the saqia's use within the constraints of the water delivery system.

While the twelve hp. pump is most costly up to an area of about seven feddans, it becomes the least costly alternative at eleven feddans. When used regularly for larger areas, the pump costs decrease until use reaches the maximum system capacity at forty feddans (Wissa 1982:28). Thus, the papers propose a technological change in the context of a traditional organization. In Haddad et al. (25), the authors suggest that members of a "saqia ring" jointly purchase twelve hp. pumps to work the land formerly irrigated by a saqia and share running costs of the pump according to usage. Since costs decrease if the pump is used for even larger areas, the papers further recommend that land irrigated by three or four saqias be joined together and that those farmers be encouraged to share the capital costs of the pumps, as would a single "saqia ring."

3.0 OPERATION OF THE LOAN FUND

The Fund was activated in early October 1982 with the issue of letters from governorate development banks to the relevant village banks setting forth the terms of the loans and stating the amount of money available for each area.

3.1 Loan Terms

An interest rate of 8% was fixed, and farmers with less than one feddan of land in their own names would not necessarily be excluded from consideration. If someone from the community with a sizeable holding would be willing to stand for the borrower and assume responsibility for the loan, the bank would raise no objection.

Within these predetermined constraints, the individual village bank was given a certain amount of flexibility in handling the loans. In Gharbia, for example, the initial letter stated that each village bank could select an amount for the down payment on the pump from 0 to 25%. In addition, the bank could select the period of repayment from three to five years.

In the three villages selected for this report, each village bank chose different terms. In Konayiset Damsheet, the bank was most conservative. It decided upon a 25% down payment and a five year loan period. In Qalib Abiar, the bank selected an initial down payment of 25% and a repayment period of four years. As the bank manager said, "Four years is the average of the three to five year range." However, in handling the down payment, the bank manager did show an admirable entrepreneurial approach. Once the initial wave of farmers purchased the pumps, he reduced the down payment to 10% and met a second wave. Then again, he cut the down payment to

to zero, expecting a third wave of interested farmers to appear. In Shabshir El Hesa, the repayment period was determined to be five years, but no down payment was ever demanded.

In addition, a charge has been added to cover the bank's involvement, varying from 10 L.E. in Shabshir El Hesa to 23 L.E. in Konayiset Damsheet. This charge has caused a good deal of resentment among the purchasers, all but one of whom had never had any previous dealings with the banks.

3.2 Allocation and Distribution of Funds

The allocation of money to each village bank was determined in the Cairo Project office by members of the Planning Unit. Based on the existing population of pumps before the Project's intervention, the cropping pattern, and other village characteristics, an initial 400,000 L.E. was apportioned among pre-test and Project villages. One key element in the allocation of money was the estimation that, on average, a pump would be irrigating eighteen feddans. This point is worth noting because it will become apparent that few of the pumps purchased through the Project's auspices will be working on an area even approaching this size.

According to these calculations, 25,000 L.E. were consigned to Konayiset Damsheet, 60,000 L.E. to Qalib Abiar, and 70,000 L.E. to Shabshir El Hesa. At the earliest stages of the Fund's operation, it appears that many requests were made. The majority of the requests were made in early November, with fewer in December, and fewer still in January. As a result, much of the money allocated has still not been loaned.

Of the 155,000 L.E. given to the three villages for the

pump loans, 78,969 L.E., or slightly more than half is still unclaimed. Furthermore, given the village conditions and terms of the loans, it appears unlikely that more of this money will be borrowed by farmers.

Still, interest in the Loan Fund and the level of borrowing has varied from village to village. In Konayiset Damsheet, where the smallest amount of money was allocated, the total 25,000 L.E. was depleted in less than two months with the purchase of nineteen high-powered pumps. In both Qalib Abiar and Shabshir El Hesa, less than half the money was borrowed. The following table provides the figures as of mid-March.

FUNDS ALLOCATED, USED AND REMAINING

Village	Loan Fund (L.E.)		
	Allocated	Used	Unspent
Konayiset Damsheet*	25,000	25,000	0
Qalib Abiar**	60,000	25,780	34,220
Shabshir El Hesa***	70,000	25,251	44,749
Total	155,000	76,031	78,969

*Estimate based on discussions with farmers in the village.

**Figures provided by the village bank in Bilshay.

***Figures provided by the village bank in El Rigdia.

In our discussions, a number of participants in the Fund in Konayiset Damsheet expressed the belief that many others in the village were interested in acquiring pumps through the Project, while the opinion in Qalib Abiar was that the pump population was already adequate for the villagers' needs and that additional pumps were unnecessary. The village was thought to be already saturated. In Qalib Abiar, the last request for a pump was made on 11 December. During the subsequent three month period, no farmer from Qalib Abiar has

expressed an interest in buying a pump with the bank's assistance. However, the manager of the bank did reveal that a number of farmers from neighboring villages had approached the bank with loan requests. While the Project Management might feel it better to exhaust interest in the Project villages first, it seems advisable at a later stage to offer similar loans to farmers from neighboring villages.

Another point which ought to be mentioned is the distress of village bank managers in having to deal with the Loan Fund. One bank manager asked that the Project remove the excess funds from his bank as soon as possible; having such a large sum of money sitting unutilized in his bank was a reflection on himself and his staff. Evidently, the bank in Tanta was growing impatient with his inability to move the money quickly enough.

The apparent disinterest of farmers is also caused by a dissatisfaction with the terms of the loans. The greatest point of contention is the length of the period of repayment. In Konayiset Damsheet, loan recipients complained that they had been told specifically by the Project's mechanization extension agent that the period of repayment was seven years, yet when they approached the bank they were told it was five. They were also told that there would be no down payment.

Others felt that the length of the period was too rigid or too brief, and that a longer period would relieve them of some of the risk-taking, since otherwise the first payment to be made at the end of year one may be several hundred L.E. Although purchasers preferring longer periods for repayment were aware that such an extension would actually increase the final purchase price, they believe that such a change would make the pump's acquisition more manageable.

While in Qalib Abiar the general consensus was that additional pumps are no longer necessary, purchasers in Shabshir El Hesa said that they could identify others in the village who had expressed an initial interest in the Fund but were dissuaded by the terms of the loans. With an adjustment in the period of repayment, they felt certain that others would come forward.

Although much of the money remains unspent in two of the villages, the three village banks have done an admirable job in processing the loan requests. Most of the loans were processed within one month. Of the sixteen purchasers, ten waited two weeks, three waited one week or less, and three waited one month or more. In the one case involving a borrower who had to wait two months for his loan request to be finalized, the problem concerned locating an appropriate person who would accept responsibility since the farmer has less than one feddan.

3.3 Suggested Changes in the Loan Fund Terms and Allocation

In only three of the fifteen participating villages, it was found that more than half of the allocated amount was sitting unused and unwanted in the village banks. It is suggested that a complete examination be undertaken in each of the villages to determine the extent of unspent monies. In one of the three villages no money has been requested for more than three months while in another village wanting farmers go unserved. It is suggested also that regular visits be made to the village banks to determine how quickly the funds are moving.

In those villages where loans are not being requested, a determination should be made about the cause. This report exposes two that are likely to be widespread: saturation of the population and undesirable terms. In the case of the former, the unspent money should be either (a) removed from the bank and deposited in another which has already had its funds depleted or (b) made available to farmers from neighboring villages. In the case of the latter, it seems advisable to make the terms more flexible, such as by extending the period of the loan's repayment from five to seven years. One approach which was favorably received by most purchasers would establish an agreed upon period between the purchaser and the bank but permit him to pay back the loan more quickly if his circumstances allowed him to do so. It should be noted that according to the original guidelines for the pump, the period of repayment was to be from five to seven years. In practice, however, the bank in Tanta has instructed village banks to limit the period to three to five years only.

3.4 Dissemination of Information Concerning the Loan Fund

Purchasers of pumps learned about the Loan Fund from four different sources: (1) members of the Farm Management Survey, (2) Project mechanization extension agents, (3) friends who work in or have ties with the village banks or the governcrate banks, and (4) other farmers in the villages.

Only one of the sixteen farmers interviewed had been in the Farm Management Survey. Most had learned from contacts in the banks. Later purchasers learned from others in the village.

In only one of the three villages, Konayiset Damsheet, did purchasers mention the Project's village extension agent. In general, then, there appears to have been no organized or formal method employed to inform villagers of the existence of the Loan Fund or of its terms. Those who did mention the Project's agent did so with bitterness. Apparently, he gave them information about the down payment and the repayment period which was inconsistent with the bank's terms.

In fact, in the three villages visited, Project personnel played a minimal or, more frequently, nonexistent role in the implementation of the Loan Fund. Village bank managers had never met with members of the Project; all communication was between the village banks and the Tanta regional office.

As one of the first implementation efforts of the Project in the villages, project personnel ought to have played a more active role. Instead, they gave complete control to the village banks and pump distributors as the following section will indicate.

3.5 The Role of the Project's Mechanization Extension Agents

To date, it appears that the Project's mechanization extension agents working in the villages have played a minimal or nonexistent role in the implementation of the Loan Fund. As was mentioned, in the only case where the agent played an active role, he gave inaccurate information about the terms of the loans which has caused mistrust and resentment.

Agents appear to have played no role in the identification of potential purchasers or in offering suggestions about the selection of an appropriate pump. In no case did a farmer cite the extension agent as the one who assisted him in choosing the company or horsepower. Although it would have provided an opportunity for the agent to form a strong working relationship with the purchasers, this did not occur. Since this report is based on visits to only three of the fifteen villages, it would be interesting to know if this is a general situation or limited to Gharbia Governorate.

Because the Project's agents did not play a part in the selection of the pump, most of the purchasers were forced to rely upon the suggestions of the distributor. As a result, the variety of pumps selected is severely restricted to the distributor's stock, and pumps in a single village are likely to come from only two or three different companies.

Once the pump was purchased and operating, the Project's agents continued to play no role in offering information concerning servicing and use. Again, all instructions have come from the distributors. Most of the purchasers, however, would welcome the assistance of the Project extension agent.

4.0 PUMP SELECTION

Figures presently available on pump purchases cover only the first three months of the Fund's operation, yet they already reveal a strong trend towards the purchase of low-powered pumps in the fifteen villages. The following table indicates both the number of pumps purchased in each class size and the number of villages with farmers who have purchased at least one pump of that horsepower.

NUMBER OF PUMPS AND VILLAGES BY HORSEPOWER

	HP. 5	6	7.5	8	10.5	11	Total
No. pumps purchased	183	33	22	11	11	24	284
No. villages	14	6	7	7	3	3	15

However, at the village level the preference becomes less clear. Of the fifteen villages, farmers in two have purchased high-powered pumps exclusively. In Konayiset Damsheet, all nineteen pumps have eight horsepower or more, while in Nikla El Enab, twelve of the thirteen pumps are eleven horsepower and the remaining one is 7.5.

Nikla El Enab, in Beheira Governorate, was the first village to receive funds, and based on its pattern of preference for high-powered pumps, the authors of the working papers were led to believe that, when given the choice, purchasers would select larger models. They speculated that "some farmers appear to recognize the cost advantages of this option" (Wissa 1982:31). However, subsequent purchases in other villages undermine this theory. It now seems likely that particular village conditions, perhaps similar to those in Konayiset Damsheet, have led the farmers in Nikla El Enab to choose the more powerful pump.

4.1 Criteria for Pump Selection

While the final decision to purchase a pump of a certain size and at a certain cost is undoubtedly made in the context of the individual household and its perception of its own resources and needs, the nature of the village as a unit of production and consumption is also closely involved. Thus, a number of factors falling outside the confines of the farming family must also be considered if we are to understand why pumps of certain sizes are preferred.

Among these factors which reflect the characteristics of a single village are the following:

- (1) landholding pattern, availability of rentable land, and extent of emigration;
- (2) cropping pattern;
- (3) water delivery and drainage systems;
- (4) availability and price of hired agricultural labor and need for custom operations.

At the level of the individual household, the following factors appear to be important considerations:

- (5) size of landholding and interest in expanding working area;
- (6) crops grown: obliged and voluntary;
- (7) access to and need for water-lift devices;
- (8) interest in undertaking custom work.

In effect, every village characteristic has a household correlate.

Finally, there are factors which fall outside the confines of both the village and the household which have also influenced purchasers:

- (9) experience with or knowledge of a particular pump;
- (10) recommendations and stock of the local machinery distributor.

4.1.1 Land

When farmers in the three villages were asked why each had a peculiar pattern of pump purchases, they frequently conjectured that the villages differed in the distribution of land-holdings. Farmers in Konayiset Damsheet were certain, for example, that they had more large farms requiring large pumps than did the others.

An initial examination of the distribution of holdings would indicate this not to be the case. The following table, based on records in the agricultural cooperative societies, would confirm this conclusion.

FARM SIZE DISTRIBUTION (PERCENTAGE OF TOTAL CULTIVATED AREA)

Village	Less than 1 F.	1 to less 3 F.	3 to less 5 F.	5 to less 10 F.	10 to less 20 F.	20 F. and above
Konayiset Damsheet	20	39	14	13	14	0
Qalib Abiar	17	41	10	16	7	9
Shabshir El Hesa	19	40	15	11	5	10

In many cases, the figures are almost identical, and the differences among the three villages do not seem to warrant the sharp distinctions in purchasing patterns.

However, discussions with farmers revealed that while cooperative records do accurately portray the owned or rented (institutionalized after the Revolution) holdings of farmers, they do not give an adequate picture of the land worked by them.

In the case of the sixteen purchasers, not one restricted his agricultural activities to only the land listed in the cooperative records. They worked the land of their wives, rented land by the year in an informal agreement with the owner, or operated large farms of pooled land held by siblings.

The renting of land for a full agricultural year appears to be a widespread occurrence. Eleven of the sixteen purchasers regularly rented land within the villages. However, the availability of land is contingent upon the ability of the owners to work the land themselves. Only one of the purchasers interviewed rented out his land, largely because he works as a teacher in the village primary school and does not have the time or assistance to cultivate the land himself.

Its availability more usually is related to the presence or absence of landholders in the village. Thus, where the rate of emigration from the village is high, more land is evidently put on the market for rent. While pump purchasers in Konayiset Damsheet noted that land for rental was plentiful, those in Qalib Abiar and Shabshir El Hesa spoke of a scarcity. In fact, according to figures collected for a different purpose, one finds that the rate of emigration from Konayiset Damsheet is much higher (11% of the population) than in either Qalib Abiar (3%) or Shabshir El Hesa (2%).

The charge for the rental of land also varies, in part because of the condition of the land, but also because of its abundance or scarcity. While in Konayiset Damsheet the usual arrangement involves the owner's taking three-quarters of the harvest, in the other two villages a cash payment of from 200 to 300 L.E. is required. As a result, in Qalib Abiar and Shabshir El Hesa, potential renters are growing wary and becoming less likely to enter into such an arrangement. They say that the charge for renting good land for cotton is 300 L.E. Since the production cost is 200 L.E. and the total income 600 L.E., the profit for one year's work is only 100 L.E. per feddan.

However, farmers in Qalib Abiar and Shabshir El Hesa will

rent land from the owner as a general practice if their own property falls within the zone mandated for rice or cotton, thereby restricting them from growing wheat or bersim for household use. In Konayiset Damsheet, where the rental of land is even more widespread, the perception of farmers that farms are larger is accurate in this context. With the rental of land to farmers who remain in the village, the land has become concentrated in larger units among fewer people.

This concentration of land in Konayiset Damsheet is one of the factors contributing to the purchase of high horse-powered pumps. Several of the purchasers in this village saw the pump as enabling them to handle more land successfully. One farmer, who has the smallest holding of 9 qirats, has each year rented one or two feddans. Last year he rented one feddan for cotton and the year before two feddans for rice. This year, he will rent two feddans for cotton and two for rice, more than he ever has previously. He attributes the increase to his pump.

In Qalib Abiar and Shabshir El Hesa, where little land may be rented, there is less of an opportunity for increasing one's working farm size. Because farmers also see the prevalent arrangement as working against their own interests, they are also less likely to see a need for purchasing large pumps.

In terms of land then, larger pumps were, in part, preferred because of the availability of excess land and a working arrangement which both parties, owner and worker, saw as mutually beneficial. Small pumps were purchased, in part, because the working farm size was close to the formal holding. The occasional renting of land to grow bersim and maize was not seen to be enough to warrant the need for a more expensive and powerful machine.

One additional factor concerning land and the selection of pumps involves the location of the property of the purchaser. According to the terms of the loan with regard to eligibility, only people with property in the selected villages are entitled to loans. However, residence in the villages is not a requirement. As a result, many of the pump purchasers either live in hamlets (ezbas) surrounding the villages which are administratively under those villages or come from entirely different villages. In the case of the latter, they may have acquired land through an ancestor who came from the village or they may have purchased land in the village. Thus, we find that of the nineteen purchasers in Konayiset Damsheet, four live in a nearby hamlet. In Qalib Abiar, of the thirty, one lives in a hamlet and six live in another village with a different cooperative. Of the twenty-two in Shabshir El Hesa, ten live in the village, five live in neighboring hamlets, and seven live in other villages.

As a result, the pump as a resource is not strictly limited to the (pre-test and) Project villages. Calculations made for the distribution of funds among the villages failed to consider that many of the machines would be used more frequently in villages neighboring the Project sites. Of the farmers who lived in another village, most of their land was nearer their homes. Although most did not express an interest in renting their pumps, they did say that they would be more likely to rent them to farmers in their own villages because they usually did not visit their land in the Project villages more than once a week.

In these cases, pumps were selected for the conditions prevalent in the purchasers' home villages. For example, of the thirty pumps purchased in Qalib Abiar, four have more

than 5.5 hp. All of these were purchased by people who live in Qusta, a different village. Therefore, all of the pumps in Qalib Abiar are 5 or 5.5 hp. In Shahbshir El Hesa, of the eight pumps with 7.5 or more hp., six were purchased by people from other villages or neighboring hamlets. In fact, the range of pumps purchased through the Loan Fund is even narrower than first perceived. All of the pumps owned by people in Qalib Abiar have 5.5 hp or less, and all but two of those purchased by people living in Shabshir El Hesa have 6.5 hp. or less.

4.1.2 Crops

The cropping patterns in each of the villages is a factor which greatly influences farmers in their selection of an appropriate pump. Although a large proportion of the cultivated land in the villages is usually devoted to cotton, maize, bersim, and wheat other crops are more variable. The most important of these are rice, fruits, and vegetables. Rice may well be the most demanding of water of all crops, requiring a constant supply. On the other hand, farmers estimated that vegetables required water once every eight days and fruit trees once every twenty days.

The relative importance of these crops in the three villages is reflected in the following table:

RICE FRUIT, AND VEGETABLE GROWING BY AREA (1982)

Village	Rice		Fruits		Vegetables	
	Area	%	Area	%	Area	%
Konayiset Damsheet	685	42	81	5	15	1
Qalib Abiar	40	2	557	30	250	14
Shabshir El Hesa	475	19	117	5	40	2

In Konayiset Damsheet nearly half the total cultivated area is regularly devoted to rice-growing. Pump purchasers interviewed in this village repeatedly attributed their need for a high horsepowerd pump to the growing of rice. However, in Shabshir El Hesa where nearly five hundred feddans of rice were cultivated in 1982, a similar need for large pumps does not exist. In this village, all of the land which falls within the rotation for rice-growing uses gravity-flow irrigation. The village land outside this area is regularly devoted to maize and vegetables where water-lift can be conducted with small pumps. In Qalib Abiar, where little rice is grown, and requests from farmers for permission to grow more are regularly turned down by the cooperative, the most important crops are fruits and vegetables which require water at longer intervals.

Therefore, the preference of farmers for large pumps in Qalib Abiar comes, in part, from their need for large amounts of water regularly through the summer months. Elsewhere, rice may be an equally important crop, but the presence of gravity-flow irrigation has made high-powered pumps unnecessary. Through the successful planning and operation of the village's water distribution system, a balance has been struck between technological and water requirements.

4.1.3 Water

In discussing their decision to purchase a pump through the Project, many of the farmers cited their frustrations over trying to obtain water during its period of availability. During the winter, since the need for irrigation water is reduced by the rains, the distribution schedule either provides water constantly, as in Qalib Abiar, or less frequently,

as in Konayiset Damsheet and Shabshir El Hesa where farmers get water for five days and none for ten. It is during the summer, when all three villages receive water for four continuous days followed by a four day break, that concerns over accessibility to water arise. As a result, most of the purchasers mentioned their desire to control the irrigation activities more personally as a reason for entering into the Loan Fund.

If the farmers interviewed in the three villages are any indication, an exclusive reliance on a saqia for water-lift is rare. Although all sixteen purchasers had property rights to saqias, fourteen regularly rented pumps. In general, two reasons were cited for the preference for renting a pump: the avoidance of conflicts with other saqia users over scheduling and the removal of their water buffalo for an increased milk production.

As the number of shareholders in a saqia increases with each generation, even if the area of land remains fixed, the organizational problems involved in meeting the irrigation needs of each farmer within the restricted period of water delivery also increase. The number of shareholders of a single saqia might be as many as twenty, each under pressure to get his field irrigated in the allotted four days or as his crops require.

Although the "saqia ring" is, indeed, an indigenously created organization which has existed over a long period of time, it is not a preferred association. Disputes with other shareholders, who are often siblings or other close kinsmen, are common. As a result, many have chosen to pay the cost of regularly hiring a pump (.60 to .80 L.E. per hour). The cost of irrigating a feddan of cotton for the

season approaches 20 L.E. Many of the saqias are now being rented out to farmers who have land adjoining the traditional irrigation site. That the charge for renting a saqia ranges from 2 to 4 L.E. per year suggests its lack of desirability and accounts for the added costs incurred by the user who must supply his own draft animal to turn it.

In no case did purchasers consider purchasing a pump with other shareholders in their saqia. There was no intention to retain the traditional organization but change the technology. The "saqia ring" is an indigenous organization tied to a fixed water-lift device which is expensive to install but relatively inexpensive to operate, aside from the loss in milk production. While shareholders see the saqia as valuable property worth maintaining, they prefer not to use it if an alternative is available. Shareholders continue to divide the costs of repair and replacement, even if they have not used it for more than a decade. To refuse to pay would likely lead to an alienation of their rights which they might want to activate in the future. In this sense, the saqia serves as an insurance against possible mishaps at some later point.

Widespread dissatisfaction with the management of the saqia mitigates against the appeal of electrifying it as is sometimes suggested or the likelihood of encouraging groups of saqia users to purchase a pump cooperatively and share its running costs according to use as the Project's working papers have called for.

The only cases of several saqia shareholders transforming themselves into joint pump purchasers involve groups of siblings who already work their land as a cooperative unit.

To enter into a cooperative purchase of a pump would likely mean risking a renewal of the conflicts that were only avoided when shareholders chose to rent pumps instead. As farmers perceive the situation, the organizational problems remain intact whatever the technology employed.

The call for a purchase of 12 hp. pumps to irrigate three or four saqia command areas totalling forty feddans is even less persuasive. The reason can best be illustrated with an example. Farmers estimate that an 11 hp. pump will need two to three hours to irrigate one feddan (a 5 hp. pump will require four to five hours). Since irrigation water is available in all three villages for only four continuous days at a time during the summer, a maximum 96 hours can be drawn upon. An 11 hp. pump working constantly would require 80 to 120 hours to irrigate 40 feddans. Although barely feasible technically, it becomes an organizational improbability. Not only would the pump have to operate constantly during the four days, it would have to be transported and managed with a speed and skill which seems highly unlikely given the conditions. If a single pump were, in fact, to be used for such a large area, one can anticipate conflicts over water and scheduling more rancorous than those occurring with saqia use for scheduling would require agreement among as many as sixty users.

Therefore, pumps were selected largely on the basis of the needs of the individual purchaser rather than in terms of a larger user's group. The purchase of high-powered pumps in Konayiset Damsheet does not, in fact, indicate an interest in using the machines for large groups of users working cooperatively. and, in this sense, does not differ from the other two villages.

A final point concerns the drainage system in the villages. In Konayiset Damsheet tile drainage has already been installed, while in the other two villages open drainage canals are used. Farmers say that with the introduction of tile drainage, they found that more water was required to irrigate their fields, again causing a need for more highly powered pumps.

4.1.4 Labor

While pump purchasers may prefer not to join together to acquire a machine, an intention to rent it out to other farmers would effectively increase its operating area. In this case, a pump could reach the lower limit of a cost-effective operation while providing the owner with an additional income source.

However, in ten of the sixteen cases, the purchasers said that they have no interest in renting out their pumps. Their reasons were the following: no one to manage the renting of the machine, the high cost of hired labor, and fear of using the machine too frequently and shortening its lifetime.

Farmers will only rent their machines if they have a member of their household who is available to take the pump from field to field and is responsible for its operation. Of the six who expressed an interest in renting their pumps, five had sons who would supervise the work. The sixth was a small holder who planned to rent land for the year and believed that he also had enough time to undertake some custom work. A farmer in Konayiset Damsheet, he purchased a 10.5 hp. pump although his own formal holding was only 1¹³ feddans. He was, in any case, one of three farmers who bought a pump larger than necessary with the expressed purpose of renting it out. The other two cases also involve 10.5 hp. pumps.

In one a widowed woman bought a pump so that one of her sons might operate it and bring income into the household. In the third case, a man with 6.5 feddans of land purchased a large pump for his own land and that of his neighbors.

Purchasers without a household member able to supervisor the operation of the pump do not rent because the cost of labor to replace themselves is too high. As farmers explain, the present hourly rental charge for a pump ranges between 60 and .80 L.E., based on the horsepower of the pump. Since they estimate an average operating day of no more than ten hours, they assume a gross income of between 6 and 8 L.E. However, if they were to hire outside laborers to assist them on their own land, they would be charged 3 L.E. per worker for a six hour work day. In addition, they would be required to supply tea and cigarettes. If they needed to hire laborers, they would be renting the pump at a deficit. Actually, the farmer does not need to work on his land every day, and it is possible for him to rent his machine without having to hire a laborer or laborers each time he does custom work. Even so, the trade-off between income generated and time and energy expended is not enough interest him. It is only if a household member is available, thus freeing up the purchaser, that custom work is generally attempted.

In most cases then the intention of undertaking custom work was not a crucial factor in determining the preferred pump horsepower. In only three cases were the household conditions such that a larger pump was selected.

4.1.5 Experience and Hearsay

When it came time to select a pump, many of the purchasers chose one they had seen previously or heard about through neighbors. In no case, was it one that they had rented and used on their land. In Konayiset Damsheet, the purchasers were influenced by a rice project that had demonstrated Kabuta and Mitsubishi pumps from Japan. Actually, all nineteen pumps purchased through the Loan Fund are one or the other. In Qalib Abiar, early buyers said that they were told about pumps from India, and later buyers simply followed suit. All thirty pumps come from India, twenty-eight of which are Usha. In Shabshir El Hesa, the pumps are a mix of Japanese and Indian.

While advice from neighbors and from the distributors was a factor in the selection of a particular brand, it does not appear to have been influential in selecting its size. Before making the final select, the price of the pump enters in, although to a surprising smaller degree than one might imagine. This is, in part, because the cost of adding one horsepower to a pump is no more than 100 L.E.

4.1.6 Available Stock

Even after the purchaser decided upon a particular pump or a particular horsepower, he was still subject to the distributor's stock. Since purchasers in any one village dealt with only one distributor, they limited themselves to his selection. In most cases, purchasers did not accurately identify the brand, although they did know the country of origin. However, two owners believed that they had pumps of a certain horsepower and actually had pumps of a different power. In both cases, they had specifically requested smaller pumps than they received. If they had been told, they did not understand.

4.2 Conclusions

Preferences for pumps of a particular horsepower are decided most strongly by owned and available land that can be worked by the household of the purchaser, the cropping pattern, and the associated irrigation requirements of both. Thus, pump buyers in Konayiset Damsheet selected pumps of eight and more horsepower. Although formal landholdings of farmers are almost identical to those in Qalib Abiar and Shabshir El Hesa, a combination of a high rate of emigration and a mutually beneficial agreement between landowner and land user are tied to an abundance of rentable land. As a result, working farm sizes in Konayiset Damsheet are larger than in the other two villages.

In addition, rice-growing is an important activity, occupying nearly half the cultivated land in Konayiset Damsheet each summer. The water requirements of rice have warranted larger sized pumps. Although, large areas of Shabshir El Hesa are also devoted to rice-growing, they are irrigated by gravity-flow.

Purchasing a large pump for the expressed purpose of undertaking custom work is not an important consideration. The dynamics of the household itself determine the ability of the purchaser to rent out his machine, and the high cost of agricultural labor usually cause him to decide to use it on his own land only.

While the price of the pumps does enter into the decision of the purchaser, advice from neighbors is said to be more influential. Finally, the purchasers are dependent upon the machinery distributors who have, on occasion, provided them with pumps in stock not in keeping with the requests of the buyers.

enter into consideration. Three purchasers, each of whom already has a farm size of more than ten feddans, say they have enough land to work. Two others have no sons to assist them and see no advantage in hiring laborers to do the work.

Then, it is worth noting that five of the remaining seven purchasers have decided either to rent land for the first time or increase the amount they ordinarily rent. Each gives as his reason for the change his acquisition of a pump. While most of these farmers will increase their farm size by one or two feddans, one of the purchasers has already made arrangements to rent an additional five feddans this year. He is a medium sized holder with two and a half feddans in his own name. With three sons to assist him, he believes he can easily undertake the larger farming area.

Thus, given the right combination of factors, the pump does act as an impetus to farmers to increase their working farm size. Apparently, they need available household labor or, in the case of others with less than one feddan, a small holding which will allow them to undertake the added work.

5.0.2 Crops

While purchasers varied in their interest in renting agricultural land, there was greater consensus concerning changes in cropping patterns and preferences. As a result of having acquired a pump, every purchaser interviewed spoke of his intention to increase the area of vegetable-growing on his land. Most usually, the farmer intends to grow more tomatoes, although melons and potatoes were also mentioned. Vegetables were singled out because of their greater water requirements and cash value.

In Qalib Abiar, one pump purchaser said that he had petitioned the cooperative for permission to grow rice but had been refused. Farmers generally see rice as a preferred crop and, given the opportunity, would grow more of it.

The acquisition of pumps may eventually alter the cropping patterns of relatives and neighbors as well. Many of the farmers said that landholders with property near theirs had already shown an interest in renting their pump, and one said that a relative has decided to grow watermelons for the first time this year because a pump will be available.

The newly acquired pump then does serve as an income-generating instrument by permitting purchasers to alter the amount of land they would ordinarily have devoted to vegetables. In many cases, farmers have decided to double the area of vegetables this year. Some who had never grown vegetables before will begin this year. One farmer in Qalib Abiar, who had only irrigated his land with a saqia and had never rented land previously, has rented two feddans this year and will devote them exclusively to tomatoes, fava beans, and white beans (lūbia).

5.0.3 Livestock Management

For those purchasers who relied heavily or exclusively on a saqia, one of the advantages of pump use is their being able to remove their water buffaloes from the saqia operation. When asked for benefits from the pump, several mentioned an already noticeable increase in milk production. Some estimated that production had already increased by half.

While purchasers appear to remove their animals from agricultural work and sell the additional milk or use it for cheese production, one purchaser in Shabshir El Hesa described

a different strategy. Before acquiring a pump, he had owned three adult females and three offspring. When he purchased the pump, he sold off all but one adult. While he had used the adults to operate a saqia, he kept one female for milk. With the money from the sale he purchased fourteen qirats of land outside the crop rotation area of the village. On it he will only grow cash crops, beginning this summer with tomatoes and melons.

5.0.4 Labor and Custom Work

As has been already discussed in Section 4.1.4 six of the sixteen farmers have decided to rent their machines to neighbors in their villages. Many anticipate charging between .60 and .80 L.E. per hour. One purchaser, an elderly man, with a 5.5 hp. pump will charge .50 L.E. as a service to the poor.

5.0.5 Water

For many of the farmers, the acquisition of a pump meant that they had no longer to squabble with other shareholders in a saqia or worry about being able to rent a pump during the summer when the machines are at a premium and often not available. As a result, they had also acquired a greater degree of control over their agricultural operations. One farmer, also a full-time teacher in the village school, said that the previous summer he had been unable to gain access to his saqia and found that all of the pumps were occupied. He was forced to hire someone with a tambour to work his land, paying him one quarter of the harvest for the service. In fact, he had been forced to rent out his land for the usual charge in his village, Konayiset Damsheet.

6.0 RECOMMENDATIONS

(1) A thorough examination of the distribution of loan funds ought to be undertaken immediately. In two of the three villages visited, no money has been dispersed for more than three months, while in the third village the money deposited in the village bank was depleted within the first two months with farmers requesting more.

(2) A Project member from the Cairo office should be directed to make regular visits to the participating village banks to get a better understanding of the fund's operation and problems. In the two village banks visited, the managers said that all contacts thus far had been through the regional bank in Tanta.

(3) In those villages with unspent money a determination must be made immediately as to whether farmers have an interest in the fund. Of the two villages with excess funds, one has reached a saturation point; in the other, villagers will likely take out loans with somewhat different terms. In those villages where further loans are unlikely, the fund ought to be opened to farmers in neighboring villages or removed and deposited in villages where the demand persists. Where a change in loan terms is required, the Project should consider returning to the original guidelines for the loans and increase the period of repayment to at least seven years.

(4) Purchasers have too often learned about the fund through personal contacts. Although it may be too late in the Project villages, a concerted effort to advertise the fund through the village cooperatives, village councils, and other units ought to be made. The Project's mechanization expert in each village ought to play an active role.

(5) To date, the Project's mechanization extension village experts have played a minimal or no role in the Fund's operation, not disseminating information about the existence of the loans, or providing suggestions about appropriate pumps to purchase, or giving advice about maintenance and repair. They ought to be brought into the Fund's operation as soon as possible. They have already received training in pump use at the Sakha Center. Should this not be adequate, additional training ought to be given.

(6) Purchasers have frequently had to select a pump on the basis of the available stock in the distributor's center. A few were sold pumps they had not requested. The restrictions on purchase are seen in the narrow range of pumps bought in a single village. Pumps in any of the three villages visited come from two or three companies. Again, the Project's village expert can assist the purchaser and make certain that the pump purchased is the same in horsepower or company as the one requested.

(7) Information collected in the three villages suggests that the Project's call for a replacement of saqias with pumps while retaining the same organization is unworkable and should be abandoned. Even if farmers were to understand the cost-effectiveness of a 12 hp. pump, the management problems that would be created are so difficult to resolve that such voluntary associations have little chance of reaching fruition.

(8) As such, the Project might best put its efforts into reviewing the variety of low-horsepower pumps available for the purpose of recommending a preferred type. The recommendation ought to be based upon operating performance, availability of spare parts, and cost.

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ANNEX C

MACHINERY DEMONSTRATION EVALUATION SERIES

NO. 1 - SILAGE MOWERS

**MACHINERY DEMONSTRATION EVALUATION SERIES
NO. 1 SILAGE MOWERS**

**Dr. Peter Reiss
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30 May 1983

Agricultural Mechanization Project

TABLE OF CONTENTS

1.0 Introduction.....1
2.0 Traditional Methods for Cotton Stalk Removal.....5
3.0 Uses for the Cotton Stalks.....11
4.0 Constraints Faced by Farmers in Cotton Stalk Removal...12
5.0 Operation of the Project's Silage Mowers.....14
6.0 Project Recommendations.....17
7.0 Farmers' Preferences.....18
8.0 The Role of the Village Extension Agents.....20
9.0 Alternative Equipment for Cotton Stalk Removal.....22
10.0 Other Equipment Desired by Farmers.....24
11.0 Recommendations.....25

1.0 INTRODUCTION

The removal of cotton stalks from the fields following harvesting is one of the more serious problems faced by Egyptian farmers. It is the last activity in the cultivation of a difficult crop which requires careful, arduous, and expensive labor and yields little return. It is not surprising to find that farmers sometimes attempt to evade the requirement that they grow cotton and risk being fined or willingly grow the recently introduced soybean in its place if given the opportunity. However, cotton continues to have an important place in the Egyptian national economy as the greatest source of foreign currency in the agricultural sector.

The need for Project involvement in the removal of cotton stalks became apparent during the summer of 1982, and it was decided that the Extension and Training Subproject would provide machinery demonstrations of silage mowers during the September through November period when the stalks are usually removed. The introduction of an effective and efficient means for removing the stalks would serve two purposes: (a) ease the difficulties of farmers in cultivating cotton and perhaps encourage them to continue growing the crop and (b) shorten the turn-around time so that the succeeding winter crop might be planted more quickly. More recently, the need for providing assistance to farmers for the removal of stalks has drawn the attention of Dr. Youssef Walli, the Minister of Agriculture, who raised the possibility that the Ministry would accept responsibility for this activity.

Three methods exist for the removal of cotton stalks. They

may be chopped in a threshing action, cut at the base, or extracted from the ground by the roots. The last two, traditionally done by hand in Egypt, may also be accomplished with tools which are tractor-powered. Given the short amount of time available for the acquisition of the equipment, the selection of technology was primarily based on the tools present in the Egyptian market. It was also obvious, at the time, from discussions with farmers, that chopping the stalks would not be acceptable.

As a result, the Subproject initially purchased ten double-knifed silage mowers made by the West German company Busatis (BM 1102) and later purchased three Italian-made double-knifed silage mowers produced by Gaspardo (FB 925). The Busatis unit sells for 1,500 L.E., and the Gaspardo mower costs 1,200 L.E. A leaflet describing the Gaspardo silage mower may be found in the appendix to this report.

Because of its greater number and earlier purchase, the Busatis silage mower has been demonstrated more widely than the Gaspardo unit. It was operated in the four Project Delta governorates (Beheira, Gharbia, Qalubia, and Sharqia) both in Project villages and in the surrounding area. The Gaspardo mower has been used in Sheikh Ahmed and, more frequently, outside the Project villages.

An evaluation of silage mowers as a tool for the removal of cotton stalks was undertaken by the Evaluation Unit. After discussions with the Team Leader, Training and Extension Coordinator, and other members of the Subproject, the configuration of the study became clear. The following questions define the boundaries of the investigation:

- (1) What are the traditional methods of removing cotton

stalks, and what constraints do farmers face in completing this activity?

- (2) What are the uses for cotton stalks, and how do these determine the preferred method of removal?
- (3) What has been the reception of farmers to the machinery demonstrations, and what interest is there in continuing its use during the next cotton season?
- (4) Has there been any noticeable effect on cropping patterns, including a greater interest in growing cotton as a result of using the tool?
- (5) How do farmers evaluate the usefulness of the Project's village extension agents?
- (6) What other tools would farmers like to see demonstrated on their land in the future?

One final point concerns the interest of farmers in purchasing the mowers themselves to become private operators doing custom work. It appears that in certain Project demonstration areas, some local farmers did, in fact, purchase silage mowers from machinery distributors. Certainly, an objective of the machinery demonstrations is increasing the involvement of the private sector in agricultural mechanization in order to supplement, and perhaps replace, government assistance. Given the importance of the subject, it has been decided that the Project's stimulation of the private sector through machinery demonstrations warrants a separate report in this series.

This evaluation of silage mowers was conducted in four Project villages in three governorates: Konayiset Damsheet and Qalib Abiar in Gharbia, Desounes in Beheira, and El Sadiine in Sharqia. In all, fourteen users were interviewed in these areas from 15 through 18 May. The Evaluation Advisor was accompanied by Mohamed Ghazi, Field Manager for Gharbia and Beheira Governorates. We were also joined, on occasion,

by Samir Ibrahim, Field Manager for Sharqia and Qalubia and by Abdel Azim Zalouk, Mohamed Ismail, Mohamed Abbas, and Samuel Raghav, village monitors in the three governorates visited.

One last note worth mentioning is the similarity of the answers given by the farmers interviewed. Although they came from a number of villages in different governorates, there was a surprising degree of uniformity in their opinions about the use of the silage mowers. For this reason, we are convinced that this seemingly small number of farmers interviewed does, in fact, represent the perceptions and opinions of farmers more generally.

2.0 TRADITIONAL METHODS FOR COTTON STALK REMOVAL

Before the introduction of tractors for land preparation, cotton stalks were pulled by the roots from the land by teams of workers. The field was first flooded, usually immediately after the cotton collection. Once there was no water standing on the surface, the workers would enter the field and begin the extraction. Their being able to enter the land depended, in part, on the nature of the soil. In areas with light, sandy soil, where irrigation water percolated down rather quickly, they might be able to enter almost immediately. With heavier clay soil, they might have to wait a day.

The actual extraction of the stalks could be started up to one week after the flooding. To wait longer might risk the land's drying out, making pulling difficult, and the flooding would have to be done again. A further limiting factor was the availability of laborers. If laborers were able to work in the fields right away, the stalks would be pulled on schedule. Occasionally, farmers would flood their fields and recruit a team of workers during the week's grace period.

Teams of laborers were composed of five or six men, working for five or six hours to pull stalks from one feddan. One landholder who used this method last year paid three pounds for each worker per feddan. Thus, when most recently used, the method cost fifteen pounds, since five workers had been recruited to do the pulling.

The use of this method for removing the cotton stalks following the cotton harvest of 1981 is somewhat unusual. Only two of the fourteen farmers flooded the land and pulled the stalks last year. The others had the stalks cut by workers. For these farmers, the last time they used this method was

from two to fifteen years ago. Pulling the stalks from the ground appears to have been the usual method until roughly six to ten years ago.

A change to cutting the stalks with a short-handled hoe coincided with the use of tractors for seedbed preparation. Before the introduction of tractors, draft animals were used to till the soil. After the land was flooded to facilitate the extraction of the stalks, farmers would have to wait a defined period to permit the soil to dry out before plowing it for the next crop. When draft animals were used, farmers waited roughly one week before the land was plowed. They reason that since the animals are relatively light, they were able to enter quickly without compacting the soil. However, with the use of tractors, the period of waiting was extended to roughly twelve to fifteen days, doubling the time because of the weight of the machines.

While the waiting period was doubled, thereby delaying the planting of the next crop, there were certain advantages by changing from a wet to a dry method for cotton stalk removal. It was noted by all of the farmers interviewed that the flooding of the land after the cotton collection washed away the animal dung used as fertilizer that had been applied by the farmers since the stalks did not soak up the water as quickly as the growing cotton plants did. In this case, more fertilizer would have to be applied. However, many farmers said that they did not put on more fertilizer and risked a lower bersim or wheat yield.

If bersim is grown after cotton, the dry method has another advantage. When the land was flooded and the stalks pulled, bersim was planted without plowing or levelling the land.

With the dry method, the land was plowed and levelled before bersim was planted producing a better crop.

Thus, the prevalent method has become, during the past decade, one which requires a team of workers to enter a dry field and cut each of the stalks at ground level. Five or six workers are brought in as a team for one feddan, working for three or four hours. In 1981 the wage for one feddan was 2 L.E., while in 1982 it was 3 L.E. Workers cannot do more than two feddans in a single day. While both methods appear to cost the landholder the same amount, 15 to 18 L.E. per feddan, the cutting method requires less time: an estimated three to four hours per feddan instead of five to six hours when the stalks are pulled. The landholders interviewed said workers complain that the pulling method is more arduous than cutting the stalks and prefer the latter, making it difficult to find workers who will agree to do it.

The cost to the landholder for the removal of the cotton stalks also depends upon their general availability. In those villages with a substantial proportion of their cultivated area devoted to cotton production, the need for a farmer to acquire stalks from others is an unusual occurrence. He is likely to grow enough for his own use. The uses of cotton stalks will be discussed in the following section. However, in those villages with relatively small areas of cotton land, workers may be found who will exchange their labor for a share of the stalks.

Thus, in Konayiset Damsheet and Desounes where more than 500 feddans are devoted to cotton each year, there is no stalk for labor exchange. However, in El Sadiine and Qalib Abiar only two to three hundred feddans are grown, making the stalks a

a rarer commodity. In these two latter villages, the scarcity of the stalks enables landholders to trade them for labor or sell them. Since even a large household does not need more than two feddans of cotton stalks for its use, landholders who have grown many feddans of cotton must dispose of the stalks. While in Konayiset Damsheet and Desounes, the stalks may be given away, in El Sadiine and alib Abiar special arrangements are made.

In Sadiine, one farmer, who had not used the Project's mower but did come to listen to the interview, said that he had given five feddans of cotton stalks to workers who cut them and removed them from his land. No money was involved. In Qalib Abiar, where only 13% of the land has been used for cotton production, and where more than half the land is used for fruits and vegetables, cotton stalks are in great demand. One farmer, who used the Project's mower on part of his land, ordinarily exchanges labor for stalks on four feddans, thus retaining two feddans worth, and sells the stalks on the rest. In 1981, he sold the stalks to other villagers for 8 L.E. a feddan, provided they cut and removed the stalks themselves.

The cutting of stalks rather than extracting them has added a labor requirement. In the past, after the stalks were pulled, they were collected by household members and loaded on camels for removal to the landholder's house. Now that the stalks are cut, they must be collected and removed to the house, but the roots still in the ground must often be disposed of. How they are treated depends on the crop which follows the cotton.

At present, the cut stalks are removed from the fields with household labor, if it is available. If not, children are hired. Generally, two or three children are hired

for 1 L.E. each for two to three hours work. The stalks may then be loaded in a tractor-pulled wagon or on camelback. Camels continue to be the more common method of transportation. In any case, the costs of the two methods are identical. A tractor-pulled wagon may require one or two trips and will cost 4 L.E. per feddan. When camels are used, it will take four loads to clear a feddan, each load costing 1 L.E. The labor is provided by the camel owner.

Once the field is clear of stalks, the roots must still be dealt with. If wheat or bersim is grown, the land is plowed with three passes and then levelled. According to farmers, this is enough to pull up the roots and break them into pieces. They are not removed from the field, but the justification is not adding organic matter to the soil. Simply, the removal of the roots would require an additional, unnecessary labor expense. Not one farmer thought that an advantage of the cutting method was that it left organic matter in the field which would improve the soil. If broad beans are grown following the cotton, the land is not plowed and the roots are left undisturbed. The plants grow in the interstices.

In summary, there is little difference between the costs and labor requirements of the two methods. With both, a team of five or six workers is brought in, each presently paid about 3 L.E. per feddan, although pulling the stalks takes longer than cutting. Following this, household members are used to collect the stalks, and children are hired otherwise. Finally, camels or tractor-pulled wagons are used to transport the stalks to the landholder's house for storage. In all, the operation may cost as much as 25 L.E. for pulling or cutting, collecting, and transporting per feddan. The farmers interviewed

uniformly stated their preference for pulling the stalks by the roots and changed to cutting the stalks only because of the delays incurred with tractor use for land preparation.

3.0 USES FOR THE COTTON STALKS

The preferred method of removal depends, to a large extent, on how the cotton stalks are used by the farmers. Universally, the stalks are used as fuel for making bread by each household. The stalks are used in combination with corn stalks and buffalodung cakes. Farmers estimate that women may use as many as 400 stalks each time they bake bread. If we estimate the number of stalks from one feddan to be 24,000 (based on a 30 cm. spacing between plants), one feddan would provide enough fuel for sixty bakings. As fuel, it is the bottom part of the stalk which burns best since it is the thickest. As a result, it is important that the stalks be cut to the ground.

Less widely, the cotton stalks are used for heating rooms. In the past, they were also used for general cooking purposes, but petrol has replaced them.

One of the farmers uses some of his stalks as filters in the drainage canals so that they serve to trap leaves and other debris.

In the past, following the harvest, but prior to stalk removal, farmers rented their land to shepherds who grazed their sheep and goats on the grass between the stalks and on the green tips of the stalks. The usual arrangement appears to have been the use of land by shepherds for one week to ten days for from 1 to 1.50 L.E. per feddan. The last time this was done in any of the villages was four to five years ago. In only El Sadiine do the shepherds still come, and they now use the land without making any payment to the landholders.

4.0 CONSTRAINTS FACED BY FARMERS IN COTTON STALK REMOVAL

As in many other areas of agricultural production, the availability of laborers for removing the cotton stalks presents a severe problem to farmers. Farmers complain that labor is expensive, rising quickly each year, and it often cannot be recruited.

At present, a landholder must go to the workers three or four days before they are to do the work and reserve their time. At this point, he frequently must pay for the as yet not undertaken work.

While landholders in villages with little cotton production have an easy time removing the stalks, because of the demand among workers, those in high cotton production areas have much greater trouble. However, even in those areas where the stalks are in demand and may be exchanged for labor or purchased, a limit to the needs of individual workers may place landholders in a similarly difficult situation as those in Konayiset Damsheet and Desounes. When a worker has acquired the amount of stalks required by his household, he too becomes independent. One landholder in El Sadiine complained that workers he had recruited to clear his land in exchange for the stalks also demanded 4 L.E. per feddan for the cutting, collection, and removal. With a team of five workers, their wage is equivalent to that paid by landholders elsewhere for the operations.

Furthermore, the requirement that the stalks be left intact for heating bread ovens is problematic. In El Sadiine, according to farmers, the Beheira Company demonstrated a cotton stalk chopper one year ago. Because it pulverized

the stalks, it was thought to be useful only for the largest landholders who simply wanted their land cleared.

A final problem faced by farmers in the removal of stalks is the scheduling that must be done in the rice-growing areas of the Project. In Konayiset Damsheet, farmers spoke of the difficulty they had collecting the cotton, removing the cotton stalks, and cutting and threshing the rice in a period of eleven to twelve days. The rice and cotton stalks had to be cut at the same time. Under the threat of rain and the ruination of the rice crop, rice was harvested first. However, if bersim was to be planted, the cotton stalks would have to be removed first, the rice left, and the danger of rain faced. In the past, bersim followed cotton, but farmers have started following the rice with bersim, thus avoiding the problem of having to decide between giving first attention to cotton or to rice. In some areas, however, the government has mandated that rice be followed with cotton, which means that the problem remains. Therefore, the rapid removal of the cotton stalks is given high priority, particularly if it can be done so that it does not conflict with the harvesting and threshing of rice.

5.0 OPERATION OF THE PROJECT'S SILAGE MOWERS

The Project began silage mower demonstrations in October in many of the Project villages in the four Delta governorates of Beheira, Gharbia, Sharqia, and Qalubia. While both a Busatis and a Gaspardo double-knifed mower* were purchased and used by the Training and Extension Component, the former was much more widely demonstrated. In all four of the villages discussed here, the Busatis was used, although in El Sadiine the Gaspardo was also tried.

The areas where the silage mowers were demonstrated were selected by the Project's village-level extension agents. Demonstrations appear to have been conducted in one location in each village before the mowers were used on the land of the participating farmers. This site often belonged to the village omda or other prominent landholder.

According to Project guidelines, farmers were not charged for the use of the mower in most of the villages. The Project also provided a tractor, and in those cases where the landholder was a tractor owner, the Project paid for the use of his tractor. However, in El Sadiine in Sharqia Governorate, farmers paid 8 L.E. per feddan to the Agricultural Mechanization Station: 2.50 L.E. for the use of a tractor and 5.50 L.E. for the use of the mower. This appears to be an unusual and suspicious development, since the initial demonstrations ought to be given without a charge.

Every farmer interviewed was dissatisfied with the operation of the silage mower. While it was praised for its speed, since a feddan of stalks can be completed in an hour,

*In fact, the Gaspardo mower, which is advertized as a double-knifed mower has a single flat knife with a moveable guard knife. It is not a true double knife.

it was criticized for cutting the stalk too far above the ground level. The closest to the ground that it cut was 5 cm., and in all four villages farmers said it frequently cut the stalk from 15 cm. to 20 cm. from the ground. This was especially the case along the sides of the plot where the blade had to be raised.

While the farmers themselves are not in a position to say, it was also the case that the mowers were not handled properly by the village-level experts or by some of their superiors. They frequently did not sharpen the knives as they had been instructed and, responding to the wishes of the farmers, sometimes ran the blades into the ground to get a lower cut although they had been warned that this dulls and possibly ruins them.

In Qalib Abiar, where cotton stalks are at a premium, the mower was to be used on a seventeen feddan plot, worked by a single landholder although actually owned by him and two relatives who live elsewhere. The previous year he had sold the stalks for 8 L.E. a feddan if the villagers cut and removed them themselves. This year, he invited the Project to cut the stalks on all seventeen feddans, but after it had cut eight of them, the villagers who were watching implored him to stop using the mower because it was cutting the stalks at a uniform 20 cm. above the ground. The villagers then completed the remaining nine feddans by hand. He sold the mower cut stalks for 8 L.E. a feddan and the hand cut stalks for 8 to 10 L.E., according to the concentration of the stalks.

The villagers had seen that half the thickest part of the stalk remained in the ground. In fact, when the stalks from

a Project worked feddan were loaded on a camel, they made only two loads when ordinarily four loads are yielded. The machine had performed so unsuitably that he was forced to hire three children to cut that part of the stalk which had been left in the ground by the mower. Paying them 1 L.E. per feddan, the total additional cost was 24 L.E. One other mower user, from Konayiset Damsheet with one feddan eighteen qirats, hired three children to clean his field of stalks afterwards. The others plowed the fields instead.

Since the mowers simply cut the stalks, the collecting and transporting of the stalks still had to be done by the landholders.

The question of possible insect or worm infestation was raised with farmers as a reason for pulling the stalks from the ground and removing them so as not to endanger the following crop. However, each farmer interviewed said that such a threat did not exist.

6.0 PROJECT RECOMMENDATIONS

Since a silage chopper was rejected from the outset as a viable tool for demonstration, the remaining options were a silage mower and an extractor. The Project's decision to demonstrate the mower was based on its being the only available tool on the Egyptian market for immediate use.

A study of the economic and financial costs of silage mowers for cotton stalk removal was prepared by the Planning and the Extension Units.* However, the study evaluated single and double blade mowers. Alternative technologies were not discussed, although manual operation was compared with machine.

The study found mechanized technology to be preferable to manual stalk cutting. A double blade mower costs 5.77 L.E. per feddan and a single blade 6.89 L.E. per feddan compared with 14.73 L.E. by hand. Economic savings were not as dramatic since the double blade mower saves 3.72 L.E. and the single only 1.05 L.E. per feddan. The report recommended the double blade option since its financial and economic rates of return are above the opportunity cost of capital, as set by the Central Bank of Egypt.

Although the double blade mower requires a larger capital investment (1,500 L.E.) than does the single blade (1,150 L.E.) it was found that the maintenance per year for the former (171 L.E.) was below the latter (111 L.E.) and required less attention: its blade was likely to dull less quickly.

*"The Economics of Cutting Cotton Stalks with Silage Mowers (A Preliminary Report), Planning and Extension Units, Agricultural Mechanization Project, November 1982.

7.0 FARMERS' PREFERENCES

Farmers uniformly stated that a tool which chopped the stalks rather than cut or pulled them was not wanted. In part, this has to do with the use of the stalk after it has been removed. Chopped stalks could not be collected or used for fuel. Another concern with chopping was that the pieces would be left in the fields and when bersim was planted, the small seeds would lodge in the chopped pieces and be washed away with the first irrigation.

Farmers uniformly preferred a stalk remover which pulled it from the ground by the roots rather one which cut it at the base. A tool which can do this would be doubly advantageous: it would remove the complete stalk and operate on dry land avoiding delays in seedbed preparation for the next crop.

When comparing the operation of the silage mower with that of hired laborers, the work of the latter was considered to be superior, since they left the field "cleaner." However, the general shortage of agricultural workers and the difficulties that farmers face in recruiting a relatively large team of five or six workers led many of them to say that the tool was better than the absence of laborers.

As noted, the cost of a team of workers is 16 L.E. per feddan. In El Sadiine, the farmers were charged 8 L.E. Yet, all of the farmers said that they would prefer to pay the extra 8 L.E. for the workers. Their concern is that workers will become even more scarce in the future.

There was a surprising uniformity of answers in terms of a reasonable price for renting the tool the coming season. While the largest holder, one from Qalib Abiar, thought that

the tool was worth no more than 1 L.E. per feddan, others thought that 5 L.E. would be reasonable, with an additional 3 L.E. for the tractor. This figure coincides with the charge in El Sadiine.

Once the stalks were removed from the ground, farmers asked that some arrangement be made to collect them at one end of the field so that the plot could be immediately prepared for the next crop.

With only one trial of the silage mowers, it is far too early to determine whether or not there will be a change in cropping patterns as a result. Since farmers are most likely to grow one of three crops (wheat, bersim, or fuul) after cotton, one conceivable effect might be an increase in yields because of a shortening of the turn-around time.

While an effective and low-cost alternative for cotton stalk removal would undeniably benefit farmers, from their responses, it seems unlikely that they would be more willing to grow cotton in the future as a result. Farmers complain of the high cost of two other operations which they regard as being more problematic: harvesting and the loosening of the soil around the seedling and initial weeding. The cost of hired labor for picking cotton can be as much as 150 to 180 L.E. per feddan, and farmers expect the cost to reach 200 L.E. next year. As such, there continues to be little motivation to continue cotton growing in the future, even with the Project's intervention in cotton stalk removal.

8.0 THE ROLE OF THE VILLAGE EXTENSION AGENTS

The Training and Extension Component has requested that this evaluation of the silage mowers include a section on the role and usefulness of the village-level extension agents who have been recruited and trained by the Project. While the aim here is not to criticize the actions of individual agents, since it is more appropriately done by the Component itself, it is worth noting certain points which could be profitably rectified.

The agents received varying reports from the farmers. One, who works in Desounes, was thought to be knowledgeable and helpful. Another, in Konayiset Damsheet, was thought to know very little about agriculture and even less about machinery. He was not taken seriously. The agent in Qalib Abiar has not been seen for several months and, for some reason, is believed to be studying English at the American University in Cairo. This matter ought to be investigated.

In general, farmers voice three complaints about the agents:

(1) They are not sensitive to the farmers' needs. Farmers believe that the requirements they face in planting are of little concern to the agents. In Desounes, the seed drill for wheat arrived three weeks late. When the Evaluation Advisor visited the village in mid-May, all of the wheat that had been planted by hand was being harvested, while the wheat that had been Project-drilled was expected to be harvested twenty days later. In fact, scheduling is not the responsibility of the village-level agents. It is done by their superiors. Agents may also be blamed for problems not related to Project

activities. In Konayiset Damsheet, farmers complained that a seed drill for cotton could not be used in their village because they had not been told earlier and so had already planted onions. Instead, the planter was used on 50 feddans in a neighboring village. While apparently untrue, the story does indicate a growing frustration among farmers with the Project's extension efforts.

(2) They make promises they do not fulfill. In several of the Project villages, people from the community have been given training in mechanics and driving. In Konayiset Damsheet, according to the father of one of those who had been trained in mechanics, he had been told by the agent that a workshop was to be built in the village and his son would be given a job there. Of the five who had been trained from Konayiset Damsheet, four left immediately for Jordan and Iraq and are presently working there. The fifth has not been able to find a job since his training was finished at the end of January. It is questionable whether such indiscriminate selection of trainees with no certainty of work in their areas really serves the Project's behalf.

(3) They provide no useful information. The agents appear to be involved in machinery demonstrations and offer no general information about machinery. Farmers have still not received information about the pump loan fund and did not know of the existence of a machinery introduction fund. As recommended in the evaluation of the water-lift loan fund, these agents, as the representatives of the Project in the villages, must play a greater role in the operation of Project activities. They ought not to limit their activities to the demonstrations, however crucial they may be.

9.0 ALTERNATIVE EQUIPMENT FOR COTTON STALK REMOVAL

Although farmers showed a decided preference for a tool which would pull the stalks out by the roots rather than cut them at the base, no such equipment has yet been introduced in Egypt.

Agro-Products, an English company based in the Channel Islands, produces a tractor-powered tool which serves this purpose. Made with high quality steel, it has virtually no wearing parts (with the exception of its tires) and needs little or no maintenance.

There are certain disadvantages, however. One problem is the cost of the unit, presently priced at roughly £3,000 sterling. It is triple the cost of the double-knifed silage mower demonstrated by the Project. It also requires systematic planting with 80 to 100 cm. between rows. At present, cotton in Egypt is more closely planted than anywhere else in the world, at roughly 30 cm. spacings. A third disadvantage is that that tool can be used only for cotton stalks, unlike the silage mowers which can be used for a number of crops.

The question of spacings with cotton is an important one which ought to be investigated by the Project. With wider spacings, obviously, fewer plants would cover a field. However, what would be the effect upon production? It may well be that with more distance between plants, production would remain the same or increase.

However, the requirement of changing such a fundamental part of cotton cultivation as the spacings between rows might produce vociferous complaints from farmers. An adjustment in the operation of the tool would likely be easier to realize.

Apparently, representatives of Agro-Products have visited

Egypt in search of a new market. They presently sell to the Sudan. During their visit, they offered to adapt the tool if roughly thirty tools would be purchased. At present, the puller has only a slight lateral adjustment which would not be enough. Should the Ministry of Agriculture decide, in fact, to assume responsibility for the stalk removal as Dr. Walli indicated, a substantial purchase from the company, with ensuing adaptations, may be in the offing.

Yet, the importance of a role that the Project might play ought to be stressed. Through the Project's Research and Development Center there is a means of adapting equipment for local conditions. Therefore, it is strongly recommended that the Project acquire at least one puller unit for demonstration and, possibly, eventual adaptation through the Center and local manufacture.

10.0 OTHER EQUIPMENT DESIRED BY FARMERS

The Training and Extension also requested that the farmers be asked about the usefulness of the machinery demonstrations and what equipment they would like to see in the future.

The demonstrations have generated interest in equipment, and farmers would like to see them continued.

As has been the case elsewhere in this report, farmers agreed on the kinds of equipment they would like demonstrated. There was great interest in wheat harvesters, and, in rice-growing areas, in rice transplanters and harvesters. Cutters for bersim might be profitably demonstrated, although ordinarily only small areas are cut at one time to feed household animals.

11.0 RECOMMENDATIONS

(1) While the silage mowers demonstrated were received with general dissatisfaction, farmers interviewed did make the point that it was better than not having hired laborers. Therefore, the implement ought to be demonstrated also following the next cotton harvest. As the shortage of workers intensifies and wages increase dramatically from year to year, farmers may feel more compelled to take advantage of the mowers. As in most other activities, there is a trade-off of advantages and disadvantages.

(2) Since the mowers can also be used for a number of other crops (including bersim, soy beans, and lentils), it would be advisable to test them more widely. Apparently, the tool has been used only for cutting cotton stalks to date. Farmers thought it might be more acceptable for other crops.

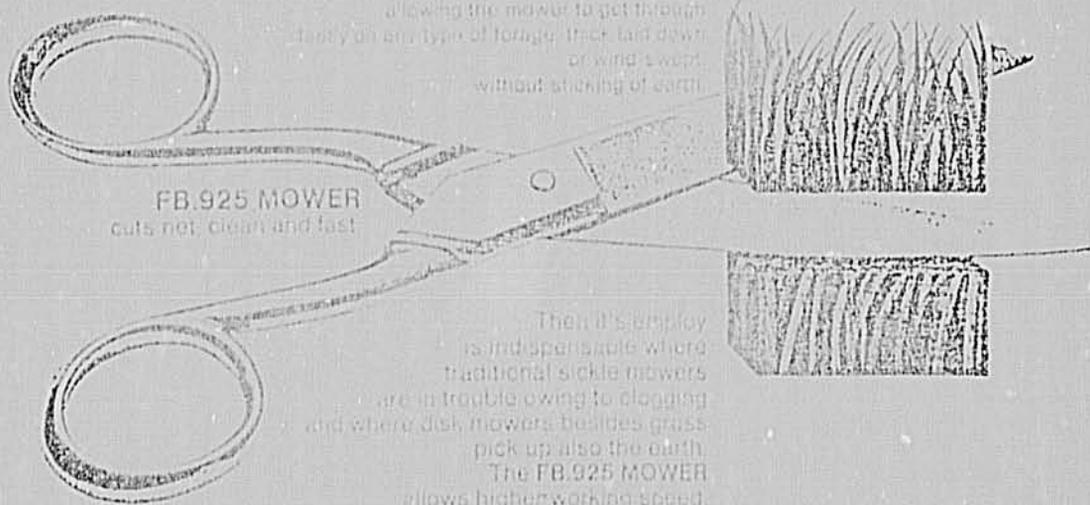
(3) Serious attention ought to be given to alternative technologies, particularly to implements which pull the stalks from the ground rather than cut them at the base. Agro-Products, an English company, already produces a cotton stalk puller which it would be prepared to adapt to Egyptian conditions. Since such arrangements might require a long period to be finalized, if at all, it is strongly recommended that the Project acquire one unit and begin demonstrations and possible adaptations.

(4) The activities and behavior of the village-level extension experts requires attention by the Component. Farmers expressions of frustrations and anger with these representatives of the Project are troubling and ought to be resolved immediately so as not to threaten future efforts.



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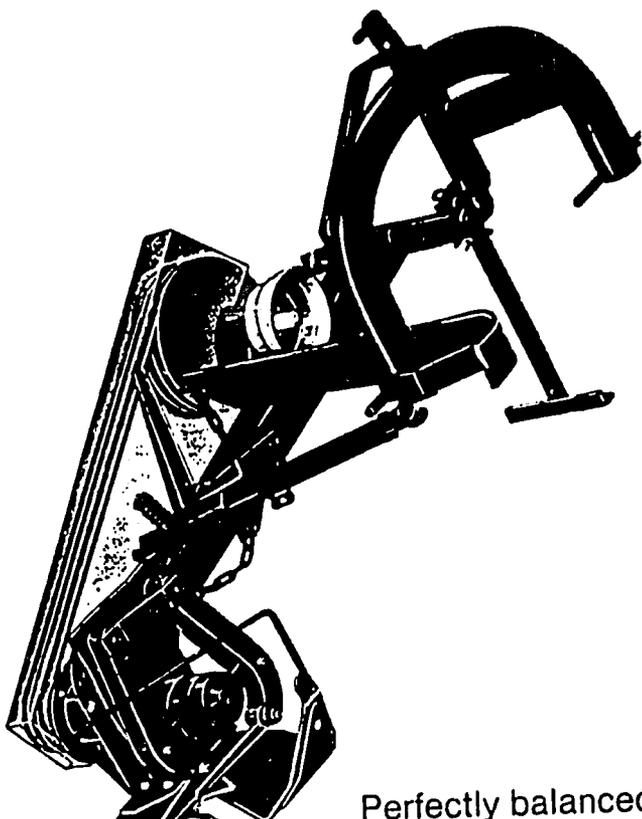
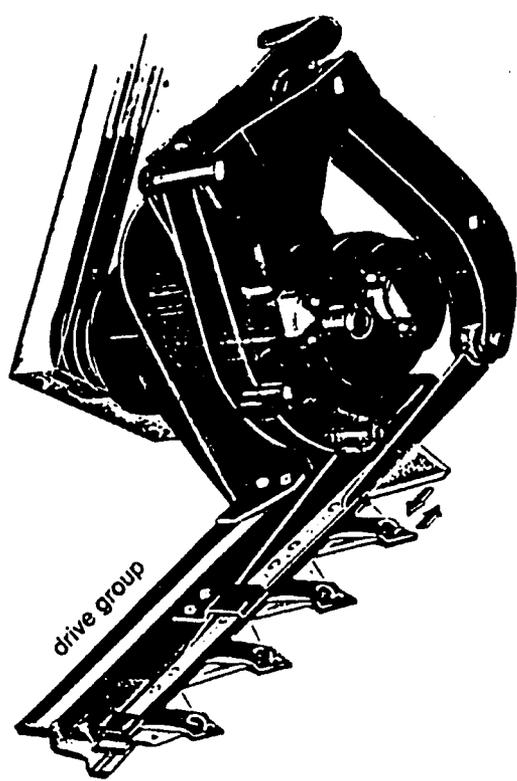
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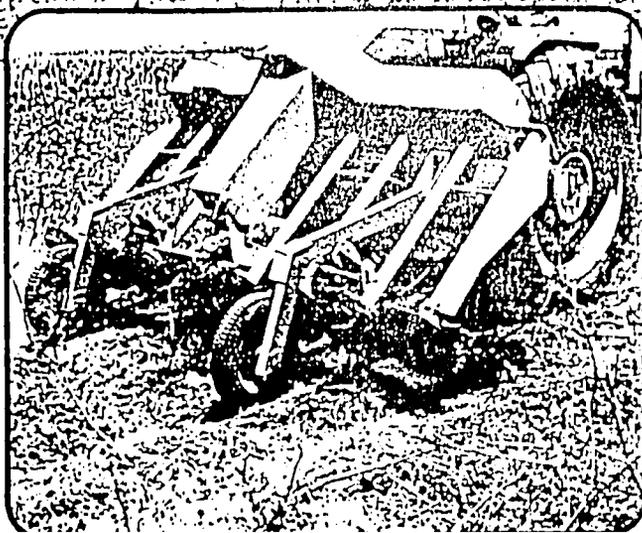
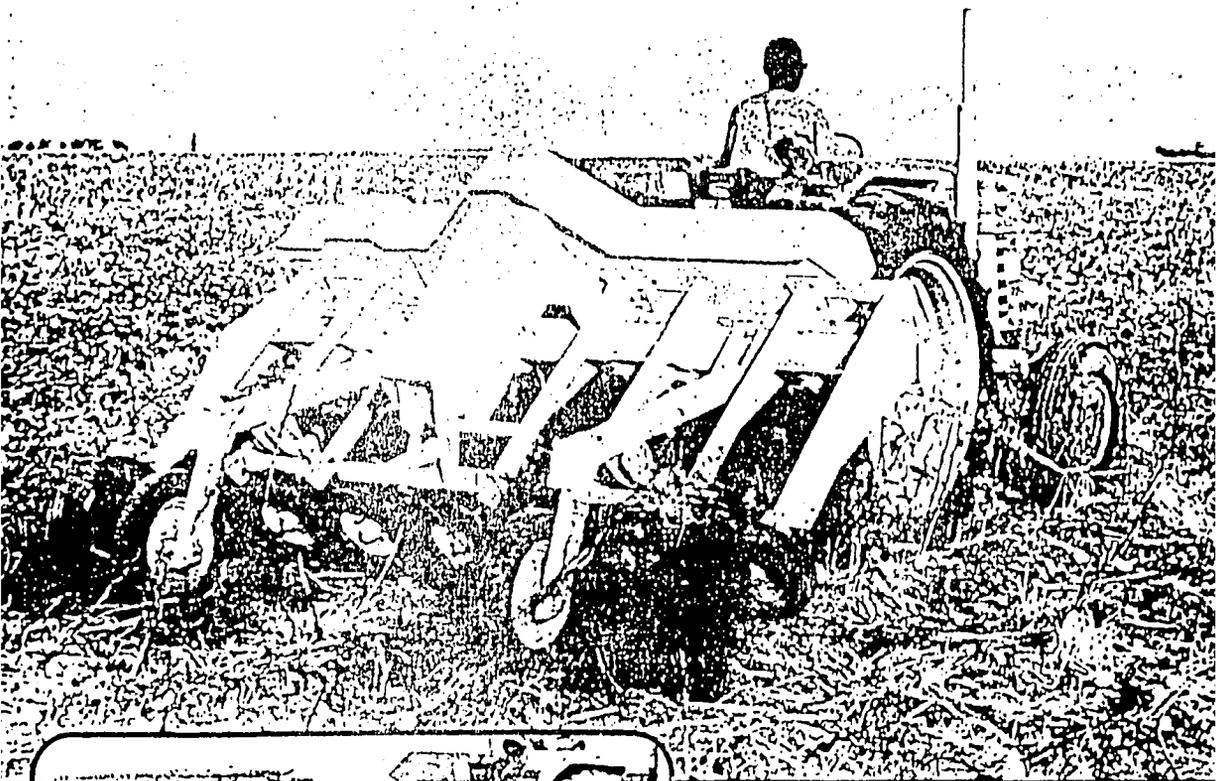
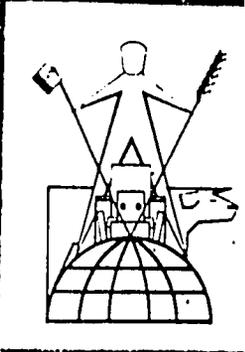
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The principles on which the machine is based were developed by the Overseas Dept., of the National Institute of Agricultural Engineering, during a four year programme of research in the Sudan. The work was funded by the Ministry of Overseas Development as part of U.K. aid to Sudan, and aid funds are being used to provide an introductory batch of commercial machines.

*Work rates measured by Overseas Dept., NIAE during tests in Sudan

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ANNEX D

OPPORTUNITY COST OF ANIMAL LABOR IN
EGYPTIAN IRRIGATED AGRICULTURE

OPPORTUNITY COST OF ANIMAL
LABOR IN EGYPTIAN
IRRIGATED AGRICULTURE

by

Zakaria El Haddad
Steven C. Shepley

ABSTRACT

The opportunity cost of animal labor used for irrigation in terms of foregone milk, meat and calf production is substantial. A statistical survey of 130 randomly selected sakia units powered by lactating buffalo and cattle showed a significant difference in product output between working and non-working animals. Non-working buffalo were found to yield an average 1.02 kilograms more milk per day, to show an increase in live market weight of 67 kilograms, and yield an additional calf over their productive life span than their working counterparts. For working cows, the mean product output losses were found to be 0.81 kilograms of milk, 16.38 kilograms of meat and one calf respectively.

Translated into 1982 product prices, these losses represent and hourly animal labor opportunity cost of E£ 0.25 for cows and 0.35 for female buffalo used in irrigation.

CONTENTS

1. Introduction	1
2. Objectives	1
3. Primary Data Sources	1
4. Secondary Data Sources	3
5. Methodology	4
6. Calculated Opportunity Cost of Animal Labor	4
7. Conclusion	8
References	9

TABLES

1. Sakia cost survey locations	2
2. El Tambadawy's Livestock Survey Samples Means for 62 Cattle and 100 Buffalo	5
3. Mechanization Project Sakia Survey Sample Means from Farmers' Responses for Non- Working Animals	5
4. Previous Estimates of Animal Losses	6
5. University of California Estimates of Animal Labor Costs	7
6. Comparison of Working Animal Milk Loss Opportunity Costs from the California and Mech- anization Project Studies	7
7. Opportunity Costs of Animal Labor in Lower Egypt	8

APPENDICES

1. Mathematical Formulation
2. Data Base

INTRODUCTION

For nearly twenty years, the focus of investments in Egyptian agriculture has been on reclaiming land under the so-called new lands program. Unfortunately, from reasons ranging from poor soils, inadequate water supply to unresolved management and administrative problems, the results of these efforts have not lived up to expectations. In many areas, New Lands have not made positive contributions to the Egyptian economy.

With the influx of foreign aid over the past decade, both external donors and Egyptian policy makers have begun to re-evaluate their priorities in an attempt to find suitable measures to promote vertical expansion of output on Old Lands as a means of reducing the country's growing reliance on imported food to feed its burgeoning population.

One of the most frequently suggested means of increasing productivity of the Old Lands is increased mechanization. Egypt is somewhat of an anomaly in that its agricultural sector is characterized by high yields and high cropping intensities which are achieved with low power inputs. Consequently, it is frequently argued that even though Egypt's agricultural output is high by developing country standards, the favorable climate and soils are such that productivity could be substantially increased through introduction and adoption of improved mechanized technology. In particular, it is argued that the continued use of lactating animals to power irrigation devices and other farm implements acts as a major constraint not only on the timeliness of agricultural operations but also carries a high opportunity cost in terms of the country's finite land, labor and water resources.

Objectives

The following paper is intended to resolve these issues by developing an empirical estimate of the opportunity cost of animal labor from irrigation studies that can be compared with the costs of mechanization in a standard benefit cost analysis. The study was divided into two phases (1) data collection and (2) analysis.

Primary Data Sources

A survey of 130 randomly selected operating sakia units was conducted in the following cooperative areas during December 1981 and January 1982.

Table 1

Sakia Cost Survey Locations		
Governorate	Markaz	Cooperative
Beheira	Mahmoudia	Dessaya
		Ezab Besentwai
	Abu Homos	El Gorn El Darawah Dessounes
Gharbia	Tanta	Shabshir El Hessa Keniset Damshit
	Bassyun	Kom El Nagar
	Kafr El Zayat	Kafr Dima Qelyb Abiar
Qalubia	Benha	El Shamout Magoul
	Toukh	Kafr El Hossafa El Hessah

The enumerators used in the survey were trained by the Mechanization Project's farm management group. The sakia information was collected from farmers already participating in the Agricultural Mechanization Project farm management survey, where rapport and cooperation between enumerators and farmers had already been established.

The questionnaire used in the survey contains 42 categorical information items and was pretested prior to start-up.

The information collected included the following general categories of data:

1. Average number of cattle and buffalo working days/months in winter and summer;
2. Average length of cow and buffalo working days in winter and summer;
3. Birth time intervals for working and non-working buffalo and cattle;
4. Market prices of 40-day old female and male buffalo and cattle calves;
5. Winter and summer daily milk production of working and non-working cattle and buffalo;
6. Summer and winter market prices for milk of buffalo and cattle;
7. Market live weights of adult working and non-working buffalo and cattle;
8. Live weight market prices of working and non-working buffalo and cattle;
9. Buffalo and cattle draft rental prices;

The survey also included data collection for daily feed inputs of berseem, straw, grains and cotton seed cake in winter and summer for working and non-working animal units. These values were not included in the quantitative analysis as it was found that farmers in the survey sample did not provide extra feed rations to working animals in either summer or winter. Thus, it was not possible to determine whether there are any marginal feeding costs associated with draft animal labor.

Secondary Data Sources

Two secondary sources were used to verify the reliability of the data collected.

A useful reference was a report prepared by Winrock International^{1/} for USAID and Catholic Relief Services (CRS) in 1980. The analysis in this report was prepared from a multi-village survey of animal production factors in Upper and Lower Egypt.

This reference permitted the authors to validate the findings of the survey and to make adjustments in one of the data items whose magnitude appeared excessive. It was noted that farmer responses to questions concerning animal productive life spans had obviously been misinterpreted to mean actual life span rather than productive life. To compensate for this misinterpretation, the Winrock productive life values were used in the quantitative procedures instead of values generated by the survey to provide what is considered to be a more realistic estimate.

The Winrock data were also used as a source for quantitative measurements of buffalo and cattle lactation periods and calving rates as these values were not enumerated by the Mechanization Project survey.

The Winrock report provided empirical formulae for the evaluation of hourly milk and calf losses.

Confirmation of derived values for buffalo and cattle milk losses was made by comparing results obtained with those of Dyer of the University of California.^{2/}

Finally, the Mechanization Project's farm management survey provided a valuable cross check on irrigation survey market prices and rental costs.

1/ Winrock International (Ref.)

2/ Dyer - University of California (Ref.)

Methodology

The categories of animal product losses (milk, meat and calves) resulting from irrigation labor were identified and evaluated through a random statistical sample of operating animal powered irrigation units. Sample statistics were performed on the data. These included calculation of means, standard deviations, coefficients of variance, mean standard errors and frequency distributions. The loss values for milk, meat and calves are the physical output quantities of working animals subtracted from the output quantities of non-working animals and multiplied by farm gate prices. The mathematical formulation for calculating the animal product losses is shown at Appendix 1. Mean sample values used in the formulae are shown in Appendix 2.

Calculated Opportunity Cost of Animal Labor

Typically, a sakia (Egyptian water wheel) is owned jointly by some five to ten farmers whose combined cultivated area does not exceed 15 feddans, the maximum practical area that can be irrigated by a sakia mechanism. Generally each farmer belonging to the sakia "cooperative" or group furnishes his own animal prime moves to perform draft work during his "turn" for irrigation. These cooperative units have been operating traditionally for many years and can be considered as informal water users' associations.

Usually, a sakia is turned by a single cow or buffalo working from three to three and one-half hours on a single shift to be replaced by a "fresh" animal for a second shift of the same duration. Use of animals for this work results in a pronounced decline in daily milk output of from 0.78 to 1.07 kilograms depending on the animal and the irrigation season, as compared to non-working animals. In addition, there is also a significant decline in calf and meat production over the working life span of the animal which averages about one calf and from 50 to 70 kilograms over its productive life span, which is 7 years for cattle and 11 years for buffalo.

Milk production is greater in winter than in summer due to the fact that the quality of the feed in total digestible nutrients (TDN) is more than double that in the summer. The major difference between milk production in winter and in summer is further enhanced by the greater availability of digestible protein (DP) in winter provided by the protein rich berseem crop. El Tambadawy's livestock survey^{1/} shows sample means for TDN consumption in winter and in summer (Table 2).

^{1/} Tambadawy (Ref.)

Table 2

El Tambadaw's Livestock Survey Sample Means for 62 Cattle and 100 Buffalo				
	Cattle		Buffalo	
	Winter	Summer	Winter	Summer
Milk yield (kgs/day)	4.61	2.19	6.98	4.40
TDN (kgs)	794.00	383.00	1017.00	502.00
DP (kgs)	126.00	28.00	163.00	37.00

The trend of these milk production findings has been confirmed by the Mechanization Project survey, as shown in Table 3.

Table 3

Mechanization Project Sakia Survey Sample Means from Farmers' Responses for Non-working Animals				
	Cattle		Buffalo	
	Winter	Summer	Winter	Summer
Milk yield (kgs/day), Non-working animals	4.78	3.26	6.84	5.02
Milk yield (kgs/day), Working animals	4.00	2.43	5.78	4.05

The use of animal power for irrigation is seasonal, with more work performed in summer than in winter because of the higher demand for irrigation water in the summer, when evapotranspiration values are more than double those of the cooler period.

There is also considerable variance in the quality, quantity and market prices of cattle and buffalo milk from season to season. Buffalo milk is slightly richer than that of cattle and the buffalo gives an average of 30% more output than cattle. The farm gate price of buffalo milk ranges from 27 to 29 piasters per kilogram from winter to summer while for cattle the corresponding seasonal values are 24 to 27 piasters per kilogram respectively. The capital costs for buffalo calves, 2-year-old heifers, and adult animals are on the average 15-25% higher than for cattle, making the use of buffalo for irrigation power more costly than use of cattle for the same purpose. Survey results show that whereas buffalo are little used for field work, they provide about 50% of the draft power for saktias. The irrigation costs per hour of use are highest in winter although the frequency of use is greater in summer.

The costing of animal labor is intricate and requires considerable care. Previous estimates of the opportunity costs of animal labor correctly attribute these costs to losses of meat and milk due to work, but there is a wide variance in the results obtained. The earlier estimates are summarized in table 4.

Table 4

Previous Estimates of Animal Losses ^{1/}			
Source	Milk Loss (LE/hour)	Meat Loss (LE/hour)	Total Loss (LE/hour)
FAO/World Bank (Ref.)	6.0	10.9	16.9
EAR 2000 (Ref.)			
Buffalo	4.7	1.9	6.6
Cattle	6.3	0.5	6.8
Louis Berger Int'l Inc. (Ref.)	11.3	3.8	24.5 ^{2/}
El Tambadawy (Ref.)			
Working less than 4 hours/day	0.0	N/A	0.0
Working more than 4 hours/day	3.6	N/A	3.6

Dyer of the University of California, in "The Opportunity Cost of Animal Labor in Egyptian Agriculture", has correctly questioned the accuracy of these estimates. They are substantially lower than the prevailing market rental prices for animal labor, which should reflect opportunity costs. Dyer's survey of farmers found rental prices ranging from zero to 50 piasters per hour with a mean of 33 piasters, and a median of 50 piasters. In the survey of farmers in Beheira, Gharbia and Qaliubia conducted for this study, the mean rental price for both buffalo and cattle was 48 piasters per hour and the median 50 piasters.

As the rental market seems to be supporting prices of this magnitude, it is agreed that consultants have generally underestimated animal labor opportunity costs. It is also noted that previous estimates have ignored the generic and seasonal losses of animal labor. None of these estimates address the calving losses and interest and depreciation costs. In the tables which follow, it will be shown that there is substantial variance in the opportunity costs of buffalo and cattle power according to seasonal activity. Interest and depreciation costs are also significant and have been included in this analysis.

The most recent estimate of animal labor costs prepared by Dr. Dyer appears to be more realistic than the preceding estimates (in Table 4). He has correctly addressed the distinction between cattle and buffalo costs in winter and in summer.

^{1/} These estimates are questioned by W. Dyer, *op. cit.*

^{2/} Includes the cost of marginal feed due to work, Louis Berger International, Inc. (Ref.)

Table 5

University of California Estimates of Animal Labor Costs (in piasters per hour)			
Cattle		Buffalo	
Winter	Summer	Winter	Summer
17	10.8	10.8	14.8

As only milk producing animals are used for draft, Dyer has concentrated his efforts upon an empirical derivation of milk losses and the opportunity costs of these losses to the farmer. The Dyer methodology for estimating the costs of seasonal milk losses was construction of four multiple regression models using El Tambadawy's thesis data. The models investigate the functional relationships between average daily milk yield as the dependent variable with animal age, total consumption, total seasonal consumption of digestible nutrients and protein, seasonal animal working hours and lactation periods as independent variables.

The results of Dyer's estimates of milk loss opportunity costs are remarkably close to the estimates of this study, even though they were derived from an independent statistical sample using a different methodology.

Table 6

Comparison of Working Animal Milk Loss Opportunity Costs from the California and Mechanization Project Studies (piasters/hour)				
	Cattle		Buffalo	
	Winter	Summer	Winter	Summer
California estimate	12.8	6.3	29.2	11.3
Mechanization Project	15.8	7.1	26.7	11.6

As the Dyer estimates for working animal milk losses are significantly close to the estimates of this study and both were empirically derived from unrelated statistical samples, the degree of confidence in the accuracy of the California and the Mechanization studies have been mutually substantiated.

Dyer does not address the question of calf losses and interest and depreciation. Also, his meat loss estimates are assumed rather than empirically derived.

The Mechanization Project loss and cost values have been derived from the recent statistical sample described above. The cost components include interest and depreciation plus the costs of identified animal product losses. These are summarized in Table 7.

Table 7

Opportunity Costs of Animal Labor in Lower Egypt (LE/Hour)				
	Cattle		Buffalo	
	Winter	Summer	Winter	Summer
Interest/depreciation	.0033	.0033	.0035	.0035
Milk Losses	.1584	.0706	.2672	.1164
Meat Losses	.0972	.0972	.1154	.1154
Calf Losses	<u>.0323</u>	<u>.0323</u>	<u>.0462</u>	<u>.0462</u>
	.2912	.2034	.4023	.2815

These estimates, which include all significant cost components, are much closer to actual rental prices than any previously prepared estimates and provide a more realistic measure of true opportunity costs which the rental market should, and does, reflect in practice.

CONCLUSION

As shown in the preceeding analysis, opportunity costs of animal labor are significant and should be taken into account when developing farm budgets and when evaluating the costs and returns of mechanized farm operations designed to replace animal intensive operations.

Farmers are beginning to recognize the high opportunity costs of animal labor in terms of reduced animal product outputs. During recent surveys of irrigation water lifting, farmers frequently mentioned loss of milk, meat and calves as one of the principal reasons for purchasing mechanized pump sets. ^{1/} The foregoing analysis and subsequent farmer response to the phenomenon of animal labor opportunity costs is adequate justification for extension efforts directed at introducing mechanical alternatives for animal powered operations. This effort is required to improve both the efficiency of farming operations and to improve on-farm and societal income through returning lactating animals to their primary function as milk and other product producers.

^{1/} "An Evaluation of the Water Lift Loan Fund - Loan Fund Operation Criteria for Pump Selection - Fund Impact on Purchasers"., Reiss et al, April, 1983.

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4. "Further Mechanization of Egyptian Agriculture." ERA 2000 INC., April, 1979
5. "Technical and Economic Feasibility of Electrifying Tertiary Irrigation Means in Middle and Upper Egypt", Louis Berger International, Inc., February 1978.
6. "Egypt-Assessment of Alternative Mechanization Practices", UNDP/FAO Technical Report Number 1, Rome, 1980
7. "An Evaluation of the Water Lift Loan Fund. Loan Fund Operation Criteria for Pump Selection Fund Impact on Purchasers", Reiss et al, April, 1983

APPENDIX 1

Mathematical Formulation

Formulae Used

1. Simple Interest:

$$I = \frac{(C+S)xi + (Lx A_h)}{2}$$

where:

- I= hourly interest costs
- C= capital and installation costs
- S= residual salvage value
- L= useful life in years
- A_h = annual hours
- i= annual interest rate

2. Depreciation:

$$D = (C-S) \div (Lx A_h)$$

where:

- D= hourly depreciation
- C= capital and installation costs
- S= residual salvage value
- A_h = annual hours

3. Interest and Depreciation

(See formulation of fixed cost components
in (1) and (2), above.)

4. Meat loss values:

$$M_1 = \frac{\Delta W\{ P \}}{\{ \Sigma A_{wt} \times L \}}$$

where:

M_1 = hourly meat loss values in £E
 ΔW = weight differential between working and non-working animal units
 P = market price of cattle and buffalo (live weight)
 A_{wt} = total working hours in season t

5. Milk loss values:

$$M_2 = \frac{\Delta M_p \times \lambda (M_t : \beta_1 \times \Omega) \times P_t}{A_{wt}} \quad \frac{1/}{}$$

where:

M_2 = hourly milk loss values in £E
 ΔM_p = average daily milk production differential between working and non-working animal units in kgs.
 λ = average lactation period in days
 M_t = number of months in season t
 β_1 = birth time interval in months (working unit)
 Ω = calving rate in %
 P_t = Milk price in £E/kg in season t

6. Calf loss values:

$$C_v = \frac{\{Lx(12 \div \beta_2) - L(12 \div \beta_1) \times (P_m + P_f \div 2)\}}{\{\Sigma A_{wt} \times L\}}$$

where:

β_2 = birth time interval in months (non-working)
 P_m = market price 40-day old male calf
 P_f = market price 40-day old female calf,

1/ "Potential for on-Farm Feed Production and Utilization by the Egyptian Small Farm Sector", p 36, Winrock International, June 1980

APPENDIX 2

Data Base

Buffalo Power Cost Data
(EE 1982)

<u>Category</u>	<u>\bar{X}-Value</u>	<u>Units</u>	<u>Array Coordinates</u>
1. Winter working days	3.13	days/month	B(1)
2. Summer working days	5.95	days/month	B(2)
3. Winter working day length	3.15	hrs/day	B(3)
4. Summer working day length	3.74	hrs/day	B(4)
5. Unit useful life	11.00	years	B(5) <u>1/</u>
6. Birth time interval(working unit)	17.38	months	B(6)
7. Birth time interval(non-working)	15.01	months	B(7)
8. Market price-40 day female calf	95.03	££	B(8)
9. Market price-40 day mal. calf	113.39	££	B(9)
10. Winter milk production(working)	5.78	kgs/day	B(10)
11. Summer milk production(working)	4.05	kgs/day	B(11)
12. Winter milk production(non-working)	6.84	kgs/day	B(12)
13. Summer milk production(non-working)	5.02	kgs/day	B(13)
14. Winter milk price	0.27	££/kg	B(14)
15. Summer milk price	0.29	££/kg	B(15)
16. Weight of working unit	392.67	kgs	B(16)
17. Weight of non-working unit	459.78	kgs	B(17)
18. Market price of working unit	587.33	££	B(18)
19. Market price of non-working unit	622.44	££	B(19)
20. Sakia rental price excl. labor	0.48	££/hour	B(20)
21. Sakia rental price incl. labor	0.77	££/hour.	B(21)
22. Lactation length	200.00	days	B(22) <u>1/</u>
23. Calving rate	80.00	percent	B(23) <u>1/</u>
24. Market price of 2 year old heffer	330.11	££	B(24)
25. Live weight market price	1.20	££/kg.	B(25)

1/. "Potential for on-Farm Feed Production and Utilization by the Egyptian Small Farm Sector", Table IV.7, p 59, Winrock International, June 1980

Cattle Power Cost Data
(£E 1982)

<u>Category</u>	<u>X Value</u>	<u>Units</u>	<u>Array Coordinates</u>
1. Winter working days	3.42	days/month	C(1)
2. Summer working days	7.29	days/month	C(2)
3. Winter working day length	3.51	hours/day	C(3)
4. Summer working day length	4.42	hours/day	C(4)
5. Unit useful life	9.00	years	C(5) <u>1/</u>
6. Birth time interval (working unit)	13.39	months	C(6)
7. Birth time interval (non-working)	11.89	months	C(7)
8. Market price-4C day female calf	67.44	£E	C(8)
9. Market price-4C day male calf	98.56	£E	C(9)
10. Winter milk production (working)	4.00	kgs/day	C(10)
11. Summer milk production (working)	2.43	kgs/day	C(11)
12. Winter milk production (non-working)	4.78	kgs/day	C(12)
13. Summer milk production (non-working)	3.26	kgs/day	C(13)
14. Winter milk price	0.24	£E/kg	C(14)
15. Summer milk price	0.27	£E/kg	C(15)
16. Weight of working unit	314.67	kgs	C(16)
17. Weight of non-working unit	367.83	kgs	C(17)
18. Market price of working unit	460.67	£E	C(18)
19. Market price of non-working unit	477.05	£E	C(19)
20. Sakia rental price excl labor	0.48	£E/hour	C(20)
21. Sakia rental price incl labor	0.77	£E/hour	C(21)
22. Lactation length	170.00	days	C(22) <u>1/</u>
23. Calving rate	80.00	percent	C(23) <u>1/</u>
24. Market price of 2 year old heffer	281.11	£E	C(24)
25. Live weight market price	1.45	£E/kg	C(25)

1/"Potential for on-Farm Feed Production and Utilization by the Egyptian Small Farm Sector", Table IV.7, p59, Winrock International, June 1980

- 227 -

ANNEX E

RESEARCH AND DEVELOPMENT:

PRIMARY AND SECONDARY TILLAGE TEST PROCEDURES

TESTS OF PRIMARY TILLAGE EQUIPMENT

Dr. Carl A. Reaves

I. INTRODUCTION

In a mechanized agricultural system primary tillage consumes a large part of the total energy requirement. Because of the high cost of energy, labor, and often because of available time it is very important to determine relative efficiencies of the various types of tillage tools. Among the purposes for performing any tillage operation are to change a given soil media to some condition that will enhance crop performance, to control weeds, to change the vertical profile, or to invert surface debris to control insects and/or diseases. One of the first questions that should be asked when designing or selecting a tillage implement is what is the nature of the force system that it should apply to the soil. The main mode of failure that most primary tillage tools impart to soil is compression until shear occurs. Hence, if the required energy to operate a tillage tool is to be kept at a minimum the soil must be failed in an upward direction, or through the shortest distance to unconfined soil.

The designer of tillage tools has at his disposal a number of options. He may design an implement such that it fails soil in small increments to minimize the extent of compaction required before shear occurs. An example of this is a subsoiler that has points to fail the soil at depths of 20, 40 and 60 cms. below the surface rather than one with a single point at 60 cms below the soil surface. Another option that the designer has is to invert the soil with a moldboard or disk plow. From the required energy standpoint, the primary advantage of these two tools is that they cause a large percent of soil failure after the furrow has been cut and lifted which greatly decreases the degree of confinement. The designer can develop an implement that does more than the normal amount of cutting soil in very small layers that alters the extent of compression before failure. Rotary tools are examples of this principle and they have advantages, but it is very difficult to keep their energy requirements as low as that of a tool that is fixed in orientation. The R&D Subproject now has a variety of primary tillage equipment available that will be tested to determine what principles of soil failure are useful under Egyptian conditions.

II. OBJECTIVES

The overall objective of this study is to determine what type of primary tillage tool is most efficient and useful to change a given soil profile to a structural state that will enhance plant root development. Requirements of this structural state include a resistance to penetration much lower than the plant root is capable of exerting, adequate voids that will permit necessary water, air, and nutrient uptake and movement, plus it must provide support for the part of the plant above the soil surface. Tools that will be included in this study include a moldboard plow, disk plow, heavy offset disk harrow, chisel,

chisel plus rotary tool, plus subsoiler with and without wings. Tests will be conducted in sand, loam, and clay soils. Specific objectives include to determine:

- A. The efficiency of soil breakup per unit of energy for the different types of tools.
- B. Effects of speed of operation on soil breakup and energy requirements.
- C. Effects of depth of operation on soil breakup and energy requirements.
- D. Effects of soil moisture content on soil breakup and energy requirements.
- E. If pertinent, the effects of rearrangement of the soil profile with respect to salt content.
- F. If pertinent, the effectiveness of managing previous crop residue.

III. TEST PROCEDURES

When possible a-1 studies will be developed on a split plot experimental design with a minimum of four replications, and randomization of test arrangement will be utilized. After each experimental location has been selected each test area will be marked with numbered wooden stakes. The first series of tests will be conducted with each tool operating at 15, 20, 25 and 30 cm. deep and operating at 5.6 km/hr. A second series of tests will be conducted with each tool operating at 3.2, 5.6, and 8.0 km/hr. and at the depth of 20 cm. Two or three tools will be selected to conduct these same tests in the three different soil types for at least two different moisture levels.

Soil measurements that will be made are mechanical analysis penetration resistance to depth of 5 cm. below tillage before tests and also after test for each tool, soil moisture content and bulk density with depth at five different locations before tests, soil aggregate analysis after each test (seive analysis), and salt content within the tilled profile before and after tillage. Other measurements that will be made include depth of operation tractor speed, percent of wheel slip, plus force and/or torque requirements when appropriate instrumentation is available. Total force exerted on the soil by front and rear tractor tires will be determined before tests are started. Equipment for measuring load transfer from implement to tractor will not be available in the near future.

IV. DATA ANALYSIS

Data will be plotted on coordinate paper and average smooth curves of best fit will be established by regression analysis. When deemed appropriate other forms of statistical analysis will

be utilized. Graphs will be made for:

1. Aggregate distribution versus tillage tool.
2. Unit draft and/or vertical force versus tillage tool.
3. Unit draft and/or vertical force versus speed of operation.
4. Unit draft and/or vertical force versus depth of operation.
5. Unit draft and/or vertical force versus soil moisture.

V. CONCLUSIONS

From the analysis of these data one should be able to draw some conclusions concerning each tool with respect to:

1. The suitability of the plant rootbed created by each tool. Of course it is expected that secondary tillage will be required for the seedbed (5-8 cm. surface layer) in all but very sandy soils.
2. Relative force requirements for the different tools to disturb a unit area of soil.
3. Effects of soil moisture content on force requirements and soil breakup.
4. Effects of speed and depth of tillage tool operation on force requirements.
5. Relative force requirements for the three different soils.

VI. FURTHER STUDIES NEEDED

1. Different combinations of primary and secondary tillage tools to create a desirable seed-rootbed in the three different soils.
2. Long term experiments to determine if primary tillage is required. Compaction by machine and animal traffic plus irrigation management will be involved with this.
3. Evaluation of other types of tillage tools that may be available in the future.
4. From information available design, fabricate, and develop smaller tillage implements that are suitable for the small Delta farms and that can be manufactured locally.

TESTS OF SECONDARY TILLAGE EQUIPMENT

Dr. Carl A. Reaves

I. INTRODUCTION

For maximum germination of any crop seed some secondary tillage is required for proper placement and soil-seed contact in almost all soil types. Secondary tillage is defined in this study as any manipulation of soil within the seedbed (5-8 cm. surface layer). Secondary tillage may consist of disturbing the entire surface layer or it may be restricted to preparing a very narrow strip of soil along each crop row. Throughout agricultural countries there are many types of tools available for secondary tillage, further many implements are composed of various combinations of different types of tools in an effort to complete preparation of the seedbed in one pass. In this study a tool is defined as a single unit of some shape that disturbs the soil, and an implement consists of two or more tools that may or may not be of the same shape.

The two primary purposes of secondary tillage are to prepare a seedbed and to kill weeds just prior to planting a crop. Attempts have been made by many researchers to define the optimum seedbed, but due to the variables involved a unique definition has not evolved. The usual basis of a definition is some description of soil structure. Factors that have to be considered in any definition of an adequate seedbed include size and shape of seed, frequency of irrigation or rainfall, soil crusting properties, ability of soil structure immediately below the seed to support emergence, etc. This study is designed to evaluate different types of tools and/or implements with respect to their ability to pulverize soil that has been disturbed by primary tillage. Hence the definition of a seedbed will be restricted to soil structure or aggregate. The R&D Subproject now has available a wide variety of secondary tillage tools that will be tested on soils that have been primary tilled.

II. OBJECTIVES

The overall objective of this study is to evaluate different types of secondary tillage tools with respect to their ability and efficiency for creating adequate crop seedbeds in soils that have been primary tilled. Tools that will be evaluated include a powered rotary tool, powered rotary tool followed by a corrugated roller, light weight disk harrow, light weight chisel plow, light weight chisel plow followed by a roller clod breaker, springtime cultivator, springtime cultivator followed by a roller clod breaker, rotary cultivator, and small land leveller. Tests will be conducted in sand, loam, and clay soils. Specific objectives include to determine:

- A. The efficiency breakup per unit of energy for the different tools.
- B. Effects of speed of operation on soil breakup and energy requirements.

C. Effects of soil moisture content on soil breakup and energy requirements.

III. TEST PROCEDURE

When possible all studies will be developed on a split plot experimental design with a minimum of four replications, and randomization of test arrangement will be utilized. To the extent possible these tests will be conducted immediately behind the primary tillage tests, but they will be conducted by a different team of engineers. Since more secondary tools than primary tools will be used, and since it is desirable to test each secondary tool behind each primary tool this procedure may not be expedient. If not, certain primary tools will be selected to till an area large enough to properly test all secondary tools. Since the performance of secondary tools is very sensitive to soil moisture content a series of tests will be conducted on at least four moisture levels for each soil. The performance of certain secondary tools is best at relatively high speeds, therefore a series of tests will be conducted for each tool operating at four different forward speeds 5, 7.5, 9.5 and 11 km/hr. and 8 cm. nominal depth. If a certain tool cannot perform properly at a given forward speed a descriptive note will be made but the data will not be recorded.

Soil measurements that will be made are mechanical analysis, moisture content as often as seems desirable and aggregate sieve analysis after each pass of any tool. Other measurements will include draft and vertical force, speed of operation, percent slip, and depth of operation (8 cm. nominal).

IV. DATA ANALYSIS

Data will be plotted on graph paper and average smooth curves of best fit will be established by regression analysis. When deemed appropriate other forms of statistical analysis will be utilized. Graphs will be made for:

1. Aggregate distribution versus tillage tool.
2. Unit force versus tillage tool.
3. Unit force versus speed of operation.
4. Unit force versus soil moisture content.

V. CONCLUSIONS

From the analysis of these data one should be able to draw some conclusions concerning each tool with respect to:

1. The suitability of the plant rootbed created by each tool with one or more passes.
2. Effects of soil moisture content on soil breakup.

3. Effects of speed of operation on soil breakup.
4. Relative force requirements for the three different soils.

VI. FURTHER STUDIES NEEDED

1. From information available design, fabricate, and develop smaller secondary tillage implements that are suitable for the small Delta farms and that can be manufactured locally. This will probably involve an implement with various combinations of different tools.